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December 4, 1991

Mr. Don Ferrier
EG&G Rocky Flats, Inc.
5932 McIntyre
Golden, CO 80403

Subject: Sludge Densification and Water Management Program
Solar Ponds/Pondcrete Project

Dear Don:

Meeting were held between November 22 and 25, 1991 to discuss the saltcrete design basis memo, waste characterization study and the upcoming treatability study. It was concluded that the processing options for pondsludge must be finalized and approved by EG&G to ensure that the treatability study accurately reflects the methodologies that will be used to remediate the solar ponds.

This document establishes the processing options that HNUS is considering. The treatability study work conducted in the HNUS laboratory in November has been factored into these decisions. The current concerns that HNUS has to address to finalize the processing options under consideration are the following:

1. Oxidation - should HNUS destroy organics which were identified in the Clarifier Sludge and 207C that exceed LDR requirements or consider that the cementing operation/dilution of waste will be an acceptable treatment for these organics (acetone, PCE, cyanide).

2. Prove that an offline belt filter is the most practical method to perform Stage I Densification of sludges.

3. Receive clarification from EG&G on any regulatory issues identified in Section 9 to this document.

4. Optimize the pressure filter tests conducted in the laboratory in November, 1991.

Please review this document and provide any comments. Comments will be incorporated into this document to reflect the consensus of the two parties. Do not hesitate to call if you see that any assumption which we have made cannot be performed at the Plant. We are continuing the engineering effort based on these concepts for the pondsludge process train.

Sincerely,
Halliburton NUS
Environmental Corporation

Ted Bittner
Project Manager

TAB:mja

cc: Don Brenneman
John Zak
Rich Ninesteel

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SLUDGE DENSIFICATION AND WATER MANAGEMENT PROGRAM
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SLUDGE DENSIFICATION AND WATER MANAGEMENT PROGRAM
SOLAR PONDS/PONDCRETE PROJECT

The intent of this draft document is to develop a sequence of operations for remediating the solar ponds. This document will establish the required planning and design criteria for equipment selections, general arrangements, and develop schedules for execution to support required completion of the work. Please note that the following proposal describes methods to process the waste that complies with all permits currently in place. However, HNUS recommends EG&G apply for permit waivers to minimize cost and improve schedule performance as identified within the Overview (Section 1.0).

1.0 Overview

HALLIBURTON NUS (HNUS) is proposing to perform all pondsludge, clarifier sludges and residual pond water solidification on the 750 Pad. The balance of the waste forms under this contract will be processed on the 904 Pad using the Pondcrete/Saltcrete Waste Processing Train.Consideration was given to locating all waste processing on the 904 Pad. It was concluded by HNUS that locating the Pondsludge Process Unit on 750 Pad minimizes transportation and logistics problems transferring pondsludge and pond waters to the 904 Pad for processing. This was perceived to be a more significant problem than transferring the equipment to the 904 Pad after pondsludge processing.

Currently the two process trains under consideration (pondsludge/pondcrete) have similar pieces of equipment from the dewatering operation to the curing station. Utility requirements are also similar (power, air, holding tanks and cement conveying systems). This proposal calls for equipment required for pondsludge processing to be procured first and installed on the 750 Pad for pondsludge processing. Upon completion of waste processing, the equipment will be water flushed, externally smear tested equipment skid and equipment components, dismantled and transferred to the 904 Pad for inclusion in the consolidated Pondcrete/Saltcrete Processing Train. The shared equipment is anticipated to include 2 Casting and Curing Stations, 2 Cement Mixers, 2 Pressure Filters, Cement Tankage, Transportable Water Storage Tankage, and Air Supply Systems. The cost of this shared equipment to EG&G is approximately $3 million. HNUS is recommending procuring only one set of shared equipment and using on both pads to process the various waste included in this contract. This recommendation, if accepted, would also minimize the total amount of potentially contaminated equipment at the end of the project.

The scheduled completion for having the ponds "clean and dry" and processing the contained waste is November 8, 1992.

HNUS recommends a Stage I Densification Program be approved which consolidates and pretreats the waste in an off-line processing mode. Settling tests conducted in the

HNUS laboratory reflect that conventional thickening operations are not feasible at the required production rates for processing. HNUS is recommending commencing consolidation and initial dewatering (up to 30% solids) early next spring with a completion by September 1, 1992. Processing of sludges into final waste forms would be conducted between August and October 1992.

The low water ratio for Pondsludge Processing approved by EG&G on September 9, 1991 appears at this time to be required to be done in two steps. Stage I Densification takes a dredged material consisting of 5-10% solids and dewaters the sludge to a 25-30% solids and deposits the sludge into an inventory area anticipated to be one of the A or B Series Ponds. This process is anticipated to be performed off-line to minimize equipment requirements. Phase II Densification and Cementing will use pressure filters to take the preconditioned sludge and dewater to 50-60% solids prior to cementing into a final waste form. This dewatered sludge will produce approximately 16 times less final waste volume than the original Statement of Work for Pond A & B. The cost savings based upon storage and container costs in Nevada is approximately $33 million for Ponds A & B.

Potential regulatory concerns which HNUS has related to the Water Management Program and the processing of pondsludge are addressed in Section 9 of this document.

2.0 Requirements

The following requirements/guidelines/regulatory understandings exist that govern the planning for this work:

1. The final waste form must be certifiable.

2. The primary concern is waste minimization of final waste volumes. The amount of waters solidified and percent solids of sludges solidified will greatly impact the final waste volumes.

3. The heater/soaker hoses and evaporation from the 374 & 910 Buildings will be used to evaporate pond water.

4. By November 8, 1992, all ponds must be clean and dry. After that date no materials may be stored in the ponds. Thus, the interceptor trench must be isolated from Pond 207 B-North.

5. Any empty pond can be used to store filtrate water prior to November 8, 1992. Any B Series Pond can hold A & B Pond filtrate. Pond water from A & B can be added to Pond 207 C.

3.0 Conditions Affecting Processing Options

1. At the scheduled start of Stage II Densification and Cementing the following conditions are anticipated to exist at the ponds:

   a. 207 A is empty.
   b. 207 B (one pond is empty).
   c. 207 C is $\pm$ 2 foot of water cover over the sludge will exist.

2. Preliminary evaluations indicate that material (water and sludges) in 207 A & B ponds does not exceed TCLP requirements for metals. Sludges in 207 A, 207 B-North and Center exceed LDR limits for cadmium. Preliminary evaluations indicate the material (water and sludges) in 207 C exceeds TCLP requirements for metals and LDR limits for cadmium, arsenic, chromium, nickel, and cyanide.

3. The 207 B Series Ponds appear to be similar in chemical characterization. There is no significant reason to indicate that ponds can not be combined.

4. Settling tests performed in the laboratory on 207 A & B indicate that settling was not an effective means to thicken the sludges based on an on-line process system. For the system to work on-line a thickener of 12,000 SF is required.

5. Laboratory analysis indicate that the sludges (A,B,&C) contain pathogens which will require disinfecting due to Health & Safety concerns.

6. The integrity of the pond liners from best to worst is 207 B-South, 207 A, 207 B-North, and 207 B-Center per EG&G.

7. EG&G does not have heater soaker hoses in A Pond.

8. The entire contents of 207 C Pond (waters and sludges) will be processed without a dewatering step.

9. The process train for 207 C is simpler than for the balance of the pondsludge processing.

10. The heater soaker system and evaporators can evaporate a larger volume of water if evaporation can be scheduled for a longer period of time.

11. Filtrate waters will need to be returned to the pond area due to the projected volumes of water anticipated to be produced in the dewatering operation of Pond 207 A, Band Clarifier.

12. On April 1, 1992 (start of Stage I Densification) one B Series Pond will be empty for use as a holding location for densified sludge.

4.0 Sequencing of Operations

The following sequence of processing of waste into final waste forms (Phase II Densification and Cementing) is planned:

1) Pond 207 C Sludge and Water

2) Clarifier Sludge

3) Pond 207 A Sludge

4) Pond 207 B Sludge (consolidated)

5) Filtrate Residue

This sequence of processing afford the following benefits:

1) Pond 207 C does not require any off-line Stage I densification dewatering. A smaller list of equipment is required to process 207 C.

2) Affords the opportunity to do Stage I densification off-line from waste processing. The off-line processing requires less equipment to mobilize since processing can occur for a longer period of time.

3) Provides EG&G a longer period of time to evaporate waters than other sequence of operations considered.

4.1 Description of Equipment Processing by Area

4.1.1 207 Pond Area

The 207 Pond Area will contain all equipment necessary to reclaim sludges and waters from the five (5) solar ponds, perform sizing of waste, perform the Stage I Densification and provide adequate Storage Inventory of Pond Sludges and Pond Waters prior to waste processing.

A list of equipment to be placed within the 207 Pond area is included in Section 6.1 & 6.2.

4.1.2 788 Building

The 788 Building can be used for processing wastes along the 207 Pond area. HNUS has evaluated this building and concluded the following:

1) The existing wooden Permacon is too small to contain the proposed pressure filters.

2) Performance standards of Hepa filters and the existing Permacon within the 788 Building are unknown.

3) Ingress/Egress from the building is deemed to be poor to support waste processing at a 20 TPH output rate.

4) Building does not contain adequate size to support the curing station and inspection requirements currently required.

HNUS recommends using the 788 Building as a warehouse for storing full crates of low level waste produced in earlier processing campaigns. The full crates are currently stored on the 750 Pad. The 750 Pad can be used more effectively to store newly produced half crates of pondsludge waste. 788 Building can also be used to store metal containers from the A Pond and clarifier sludge if required.

4.1.3 750 Pad Area

The 750 Pad Area will be used to contain the Stage II Densification and Cement Equipment. The pressure filters and cement mixing equipment is anticipated to fit in one large Permacon currently located on the 750 Pad area. The bulk dry cement storage (and other reagents) will be outside of the tents in appropriate temporary storage vessels. The dirty water separator tanks and process water tank will be located on the pad but outside of the tents. Diesel generators to supplement the plant power will be located outside the tents along with air compressor systems. Floor space requirements within the tent area is assumed to be similar to that presented in the Material Handling Study shown on Drawing # ____.

At the completion of Pondsludge processing it is intended that the systems will be water flushed, externally smear tested and dismantled, for transportation to the 904 Pad for installation in the Pondcrete/Saltcrete Process Train. The curing station will be cleaned and packaged for transportation to the 904 Pad for inclusion in the Pondcrete/Saltcrete Process Train.

4.2 Water Management

All water management and evaporation efforts will be performed by EG&G. The primary system is considered to be the heater soaker hose contained in the B Series Ponds. Supplementary systems are the 374 & 910 Evaporator Buildings. The 374 Evaporators are scheduled to provide evaporation support for 207 A Pond, 207 C and as a backup to the heater soaker system in the 207 B Series Ponds. The 910 Evaporators are not in service as of the date of this proposal but are scheduled to evaporate waters from the interceptor trench. This water is currently pumped to 207 B-North for long term storage. Three (3) 1,000,000 gallon storage tanks are being constructed to store water from the interceptor trench. Once the storage tanks are completed, interceptor trench water will not continue to be pumped to the 207 B-North pond. The current permit does not allow waters in the ponds to be pumped to the storage tank to assist in emptying the ponds to reach the required "clean & dry" ponds mandate of November 8, 1992.

During 1991, progress was made lowering the water level within all the ponds. Meetings held on November 22, 1991 reflected the following progress to be accomplished by the start of waste processing:

1) 207 A is empty

2) 207 B (one pond is empty)

3) 207 C is at the current water level

The two parties will have to coordinate the evaporation effort to maximize the benefits associated with lowering the liquid level within each pond. The following priority sequence for reducing the levels of liquids within the ponds is proposed:

1) 207 B-South

2) 207 B-Center

3) 207 B-North

4) 207 A

5) Clarifier Water

The priority sequence recommended calls for the B Series Ponds to be given first priority. It is HNUS recommendation that the heater soaker hose system to be used for the B Pond Series. Any excess evaporator capacity form the 374 Building should be used to evaporate water from the 207 A Pond.

HNUS recommends that EG&G not continue to evaporate water from 207 C. The salts in the water appear to be at or near the saturation point. Continued evaporation techniques may continue to further concentrate the salts. The continued evaporation may prove to be counter productive since HNUS may have to dilute the waters with fresh water to process the wastes. Appendix 1 describes laboratory observations of the 207 C water crystal tests observed last week.

If EG&G is successful in repermitting the RCRA management units into one unit (A & B Series Ponds) the first priority for water evaporation should be Pond 207 A. 207 A would be used to deposit Stage I densified sludge from A and B Series Ponds. Pond 207 B-South would be used to store filtrate water from the Phase I & II sludge densification operations. The primary reasons for the recommendation are:

1) The most competent pond liners are the 207 A and 207 B-South.

2) Pond 207 A has a built in sump which would provide a convenient collection point for sludge reclaiming during Stage II Densification and Cementing.

5.0 Description of Waste Processing by Waste Form

5.1 Terminology

The following terminology will be used to describe the following activities associated with remediating the Solar Ponds.

Reclaim from Pond - A system for removing sludges and waters from a pond. System could include a suction dredge, vacuum truck, super sucker vacuum pump, or manual removal from the pond.

Size Reduction - Envisioned to be a pin mill capable of reducing the grain size of all the materials to less than 10 mesh (2.4mm).

Chlorination/Oxidation - A process to disinfect the sludges of biological pathogens. Oxidation may be considered to destroy organic compounds identified to be able LDR restrictions.

Stage I Sludge Densification - An off-line system capable of dewatering sludges with an input ranging from 5-10% solids to a final output consistency of 25-30% solids.

Storage - Primary storage is assumed to be within one of the ponds. Temporary storage to consist of agitated tankage capable of holding several hours of raw sludge.

Stage II Filtration - An on-line filter system capable of additional dewatering up to 50-60% solids. Filtrate waters will be returned to the pond.

Cement Mixing - A process of uniformly mixing pozzolanic materials with the waste to form a stable final waste form.

Evaporation - EG&G activity using a water management program. The heater soaker hose system will be the primary system. The 374 Evaporator is available to assist dewatering efforts. The 910 Evaporators will be used to evaporate interceptor trench water stored in tankage northeast of the evaporator ponds.

A brief description of each waste form processing follows. Each description describes those steps which are specific to that waste form.

5.2 207 C Pond Sludges and Water

The contents of the 207 Pond (sludges and water) will be processed into a final waste form. No attempts will be made to densify the sludges by removing water prior to casting the waste into a stable waste form. Two objectives exist for the methodology selected for processing of the waste:

1) Create a uniform slurry comprised of approximately 20 % solids for waste feed input.

2) Minimize fresh water addition to the slurry. The current plan for creating a uniform slurry consists of one of two methods under consideration.

   Method 1 - Mechanical Breakage of Sludge Crystals

   A mechanical device with adequate weight to be drug along the top of the sludge would be constructed that would produce adequate shearing forces to break the hard crystal formation on top of the sludges discovered during sampling campaigns in August and November 1991. A similar device has been used in the past at Rocky Flats to clean the

pond.

Once the hard crystals are broken into manageable pieces, a suction type pump will be designed with adequate velocity at the suction head to pick up three inch minus materials. The pump will discharge to a trash screen. At the completion of reclaiming sludges and waters from the pond, manual cleaning will be performed to remove any isolated crystallized areas which have been missed from the mechanical breakage process. Residual crystals will be loaded into trash boxes for processing on the 904 Pad.

Initially the pumped material which is run over the trash screen will be returned to the pond. The purpose is to "turn over" the material prior to preparing the material for processing. After all the material has been "turned over" the trash screen underflow pump will pump the slurry material to the pin mill, located on a skid adjacent to the 207 C Pond which will grind all the material (in an open circuit) to a minus ten (10) mesh screen size. The underflow will be pumped to a series of Halliburton type (MX-5000) agitator holding tanks for final pretreatment. The pretreatment may consist of chlorination and/or lime addition as defined in the treatability studies.

The slurry in the agitator tanks may be considered as individual batches. Sample collection points exist in the tanks recirculating piping within the tanks for collecting samples for laboratory analysis as required within the treatability study.

The suspended slurry within the tankage will be pumped in a double contained pipeline to the 750 Pad for final cementing into the final waste form.

Method 2 - Heating Pond Waters to Remove Hard Crystals in the Ponds

The treatability studies will determine if it is practical to raise water temperatures (below 100°F) to dissolve the crystal salts. If this appears practical, a turbine pump with a jet nozzle will be constructed that can heat the pond waters and create enough turbidity to drive the existing crystals into solution. The current schedule indicates that the 207 C Processing will be done during the early summer months. The hard crystals discovered in June by Weston and in August 1991 by HNUS appear to be only a few inches thick in certain areas of the pond. Those discovered in October were several feet thick. If this methodology is selected, the process train holding tanks will be heated

for temperature control.

The methodology for processing downstream of the holding tanks is similar between the two methods. Within thirty (30) days, HNUS should be able to make a recommendation on the preferred method.

Once the slurry is pumped to the 750 Pad, it will be held in small day tanks for cementing into the final waste form. The treatability study currently underway will reflect the prescribed methods for mixing and introducing reagents required for producing a stable waste form.

5.3 Clarifier Sludge

5.3.1 Stage I Clarifier/Thickener Sludge Densification

The excess waters above the sludge in the clarifier will be removed by EG&G with a vacuum truck for transportation to the 374 Building for evaporation prior to Stage I Densification Processing. HNUS will reclaim the sludges within the clarifier by using a super sucker pump or similar pumping devise to pump the majority of the sludge from the clarifier. The balance of the sludges will be removed by using the existing thickener underflow pump in conjunction with water spray from a low pressure pump to wash the settled sludges into the underflow pump. The sludges will be pumped to the pin mill and ground in an open circuit prior to pumping to the self contained belt press filter. Filtrate from the dewatering step will be returned to a tanker truck supplied by EG&G for storage. Once all the sludges have been removed from the clarifier, EG&G will transport filtrate waters to the 374 Evaporators.

The dewatered sludges from the belt filters ($\sim$ 5,000 gallons) will be placed in metal containers and stored in the 788 Area prior to Stage II Densification and Processing.

A Block Flow Diagram (attachment # 2 & 3) is included depicting the initial dewatering step for the Thickener/Clarifier.

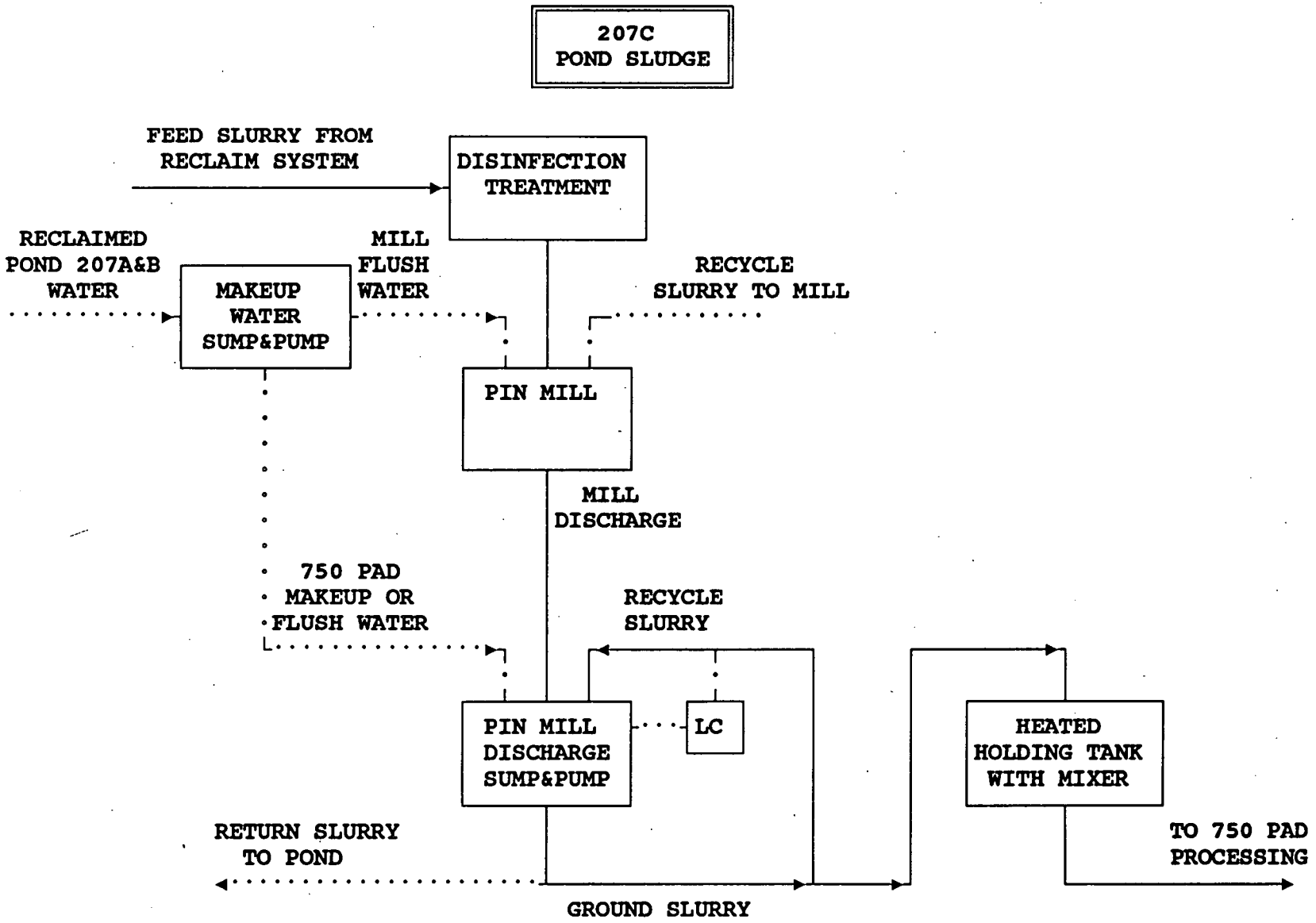
5.4 207 A Sludge Processing

5.4.1 Stage I Densification - 207 A

The initial dewatering step for 207 A will be similar to the method used for the 207 B Series Ponds. If the RCRA management areas (A & B Ponds) cannot be combined into one unit, HNUS recommends

ATTACHMENT 1

POND SLUDGE RECLAIM AND SIZE REDUCTION - 207C POND ONLY



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that the initially dewatered sludge be placed in metals for interim storage and stored on the A Pond Berm. The quantity of sludges obtained in A Pond is believed to be minimal (20-100 cy) of material. Attachment # 4 & 5 reflects a Block Flow Diagram of the initial dewatering step envisioned for Pond 207 A. Filtrate from the dewatering would be returned to 207 A if required by regulatory limitations or tanker trucks.

5.5 Pond 207 B Sludge (Consolidated)

5.5.1 Stage I - Densification - 207 B Ponds (Off-Line Processing)

For the initial dewatering operation to work as envisioned one of the B Series Ponds must be emptied to provide an inventory storage area for dewatered sludge. From the waste characterization finding presented to EG&G, we conclude the following:

1. The pond waters are cleaner than the sludges.

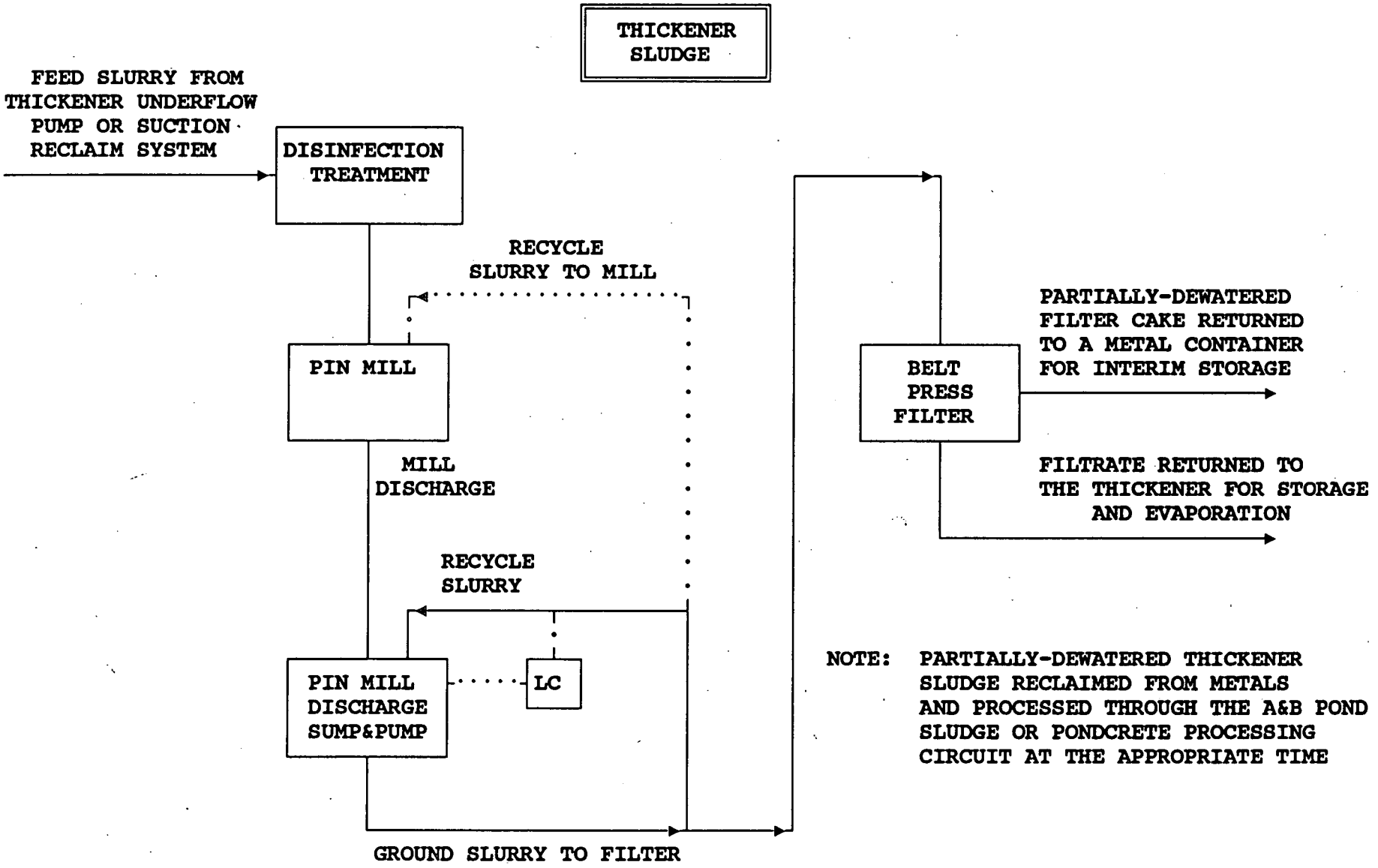
2. The liner quality varies dramatically within the 207 B Series Pond. Relative rankings reflect that 207 B-South is the most integral liner followed by 207 B-North and 207 B-Center being considered the least desirable pond to store materials.

HNUS recommends pumping the contents of 207 B-South into 207 B-North prior to commencing Stage I Densification. The 207 B-South need not be clean and dry but only be considered empty. HNUS recommends consolidating and storing sludges in Pond 207 B-South and storing filtrate water in 207 B-North for additional evaporation by EG&G.

Stage I Densification operations will commence in 207 B-Center with the removal of sludges and waters using the reclaim system described in 207 C Stage I Densification (Section 5.2). Once the pond is emptied it will be cleaned and taken out of service. The EG&G vacuum truck will be used to assist final cleanup of any residues. These residues will be transferred to any pond which has not been processed to date.

207 B-North will be processed under the Stage I densification and filtrate waters will be returned to 207 B-North and the thickened sludge will be placed in 207 B-South.

ATTACHMENT 2
THICKENER SLUDGE RECLAIM AND SIZE REDUCTION



NOTE: PARTIALLY-DEWATERED THICKENER SLUDGE RECLAIMED FROM METALS AND PROCESSED THROUGH THE A&B POND SLUDGE OR PONDCRETE PROCESSING CIRCUIT AT THE APPROPRIATE TIME

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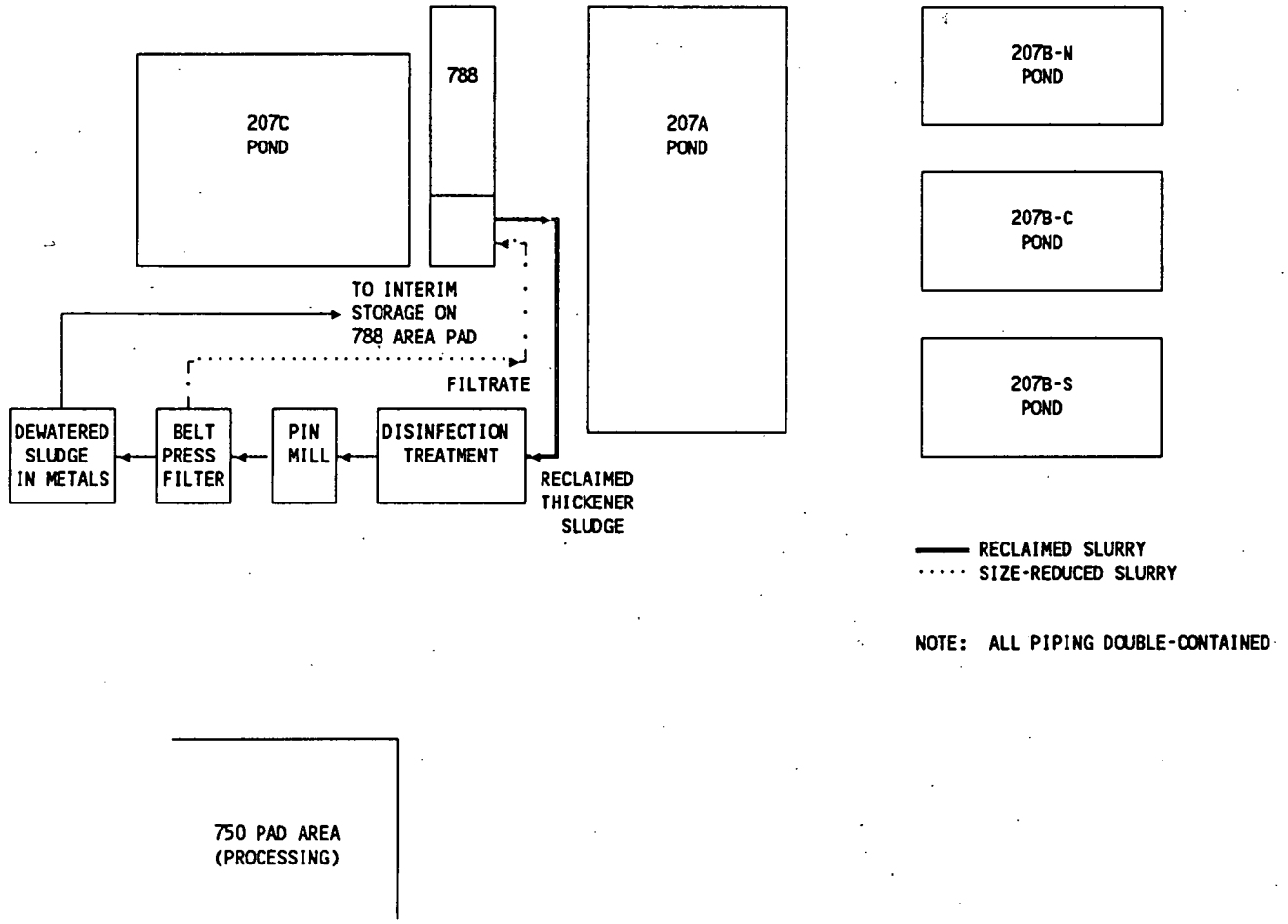
ATTACHMENT 3
PHASE I DENSIFICATION
PRETREATMENT & WATER MANAGEMENT
INITIAL DEWATERING - THICKENER SLUDGE



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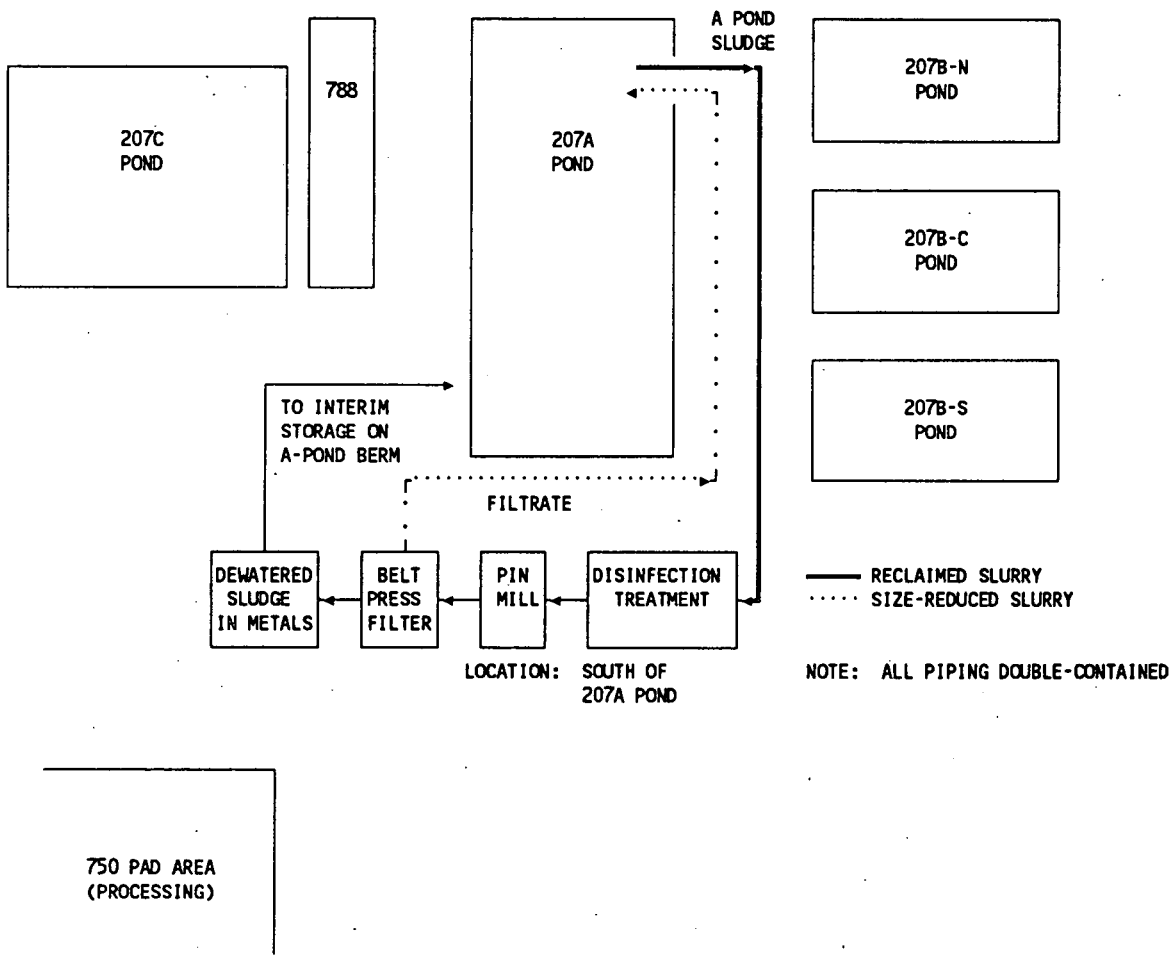
ATTACHMENT 4
PHASE I Ddensification
PRETREATMENT & WATER MANAGEMENT - INITIAL DEWATERING 207A



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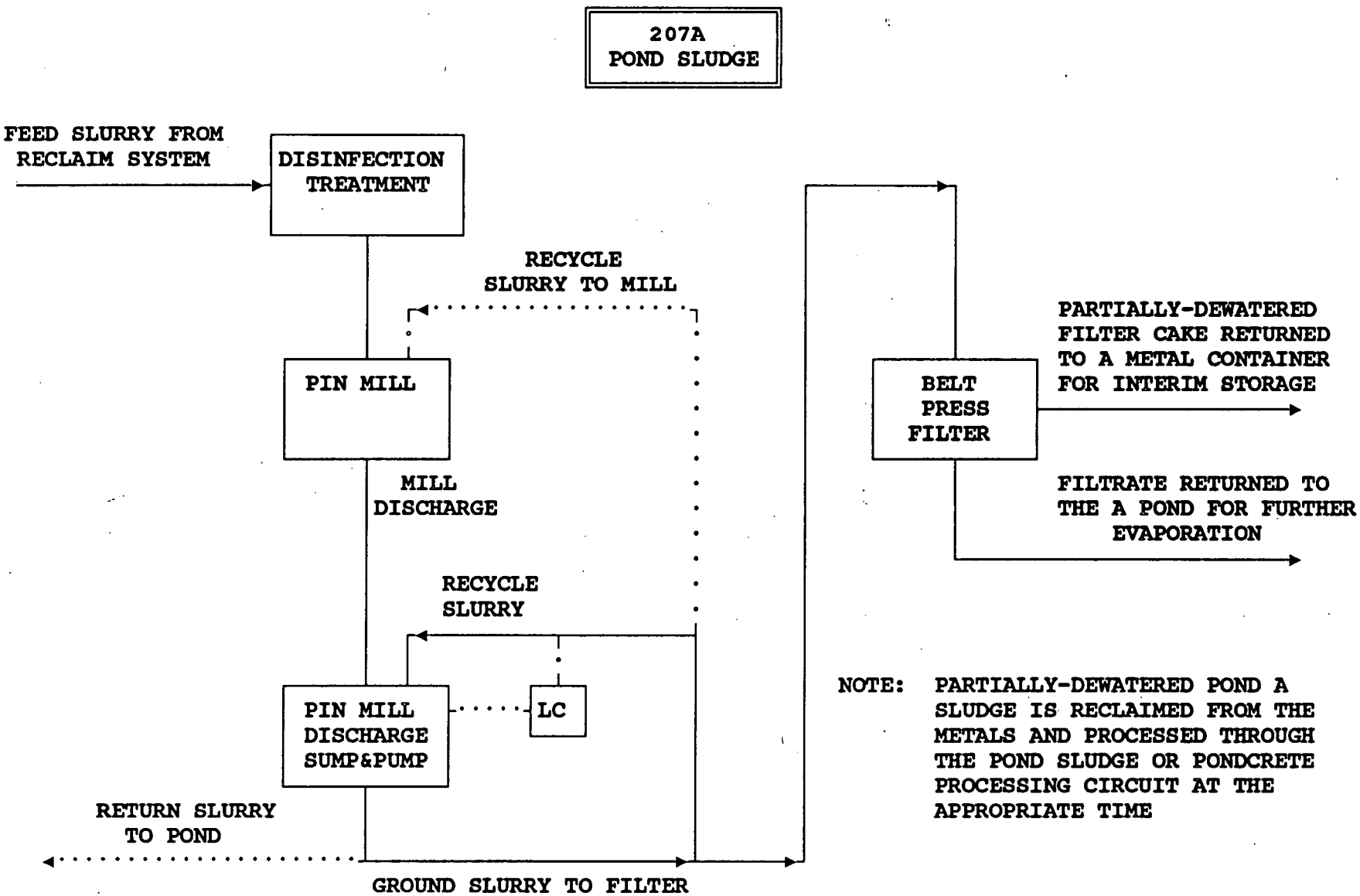
ATTACHMENT 5
PHASE I DENSIFICATION
POND RECLAIM SYSTEM - POND 207A ONLY



NOTE: PARTIALLY-DEWATERED POND A SLUDGE IS RECLAIMED FROM THE METALS AND PROCESSED THROUGH THE POND SLUDGE OR PONDCRETE PROCESSING CIRCUIT AT THE APPROPRIATE TIME

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6.0 Stage I Densification (Off-Line Processing)

Stage I Densification will consist of the following activities:

1) Consolidating the B Series Ponds into one pond of sludge and one or more ponds of "clean" waters.

2) Pre-sizing of all sludges and trash to a ten (10) mesh minus size.

3) Segregation of oversize trash from the ponds into trash containers.

4) Disinfecting the sludges to remove the pathogens. This is currently planned to consist of introducing calcium hydrochloride into the collected dredge material (water & sludges).

5) Pre-conditioning the sludge - it is envisioned that the sludges will require preconditioning prior to dewatering. This could include the addition of lime to adjust the Ph and/or the use of cationic polyelectrolytes to improve filterability.

6) Oxidation Step - This step will be required if the organic compounds require additional treatment. This will be determined in the treatability study.

7) Dewatering - The current plan is to consider a belt filter press capable of producing a filter cake upwards of 30% solids. The machine can receive a dilute solids (2-5%) input with little variance in output quality or quantity. Output percent solids anticipated in 25-30% solids. Filtrate waters containing 2 ppm of free chlorine and water anticipated to be pH adjusted to 11.5 to 12 will be returned to a B Series Pond for additional evaporation efforts by EG&G.

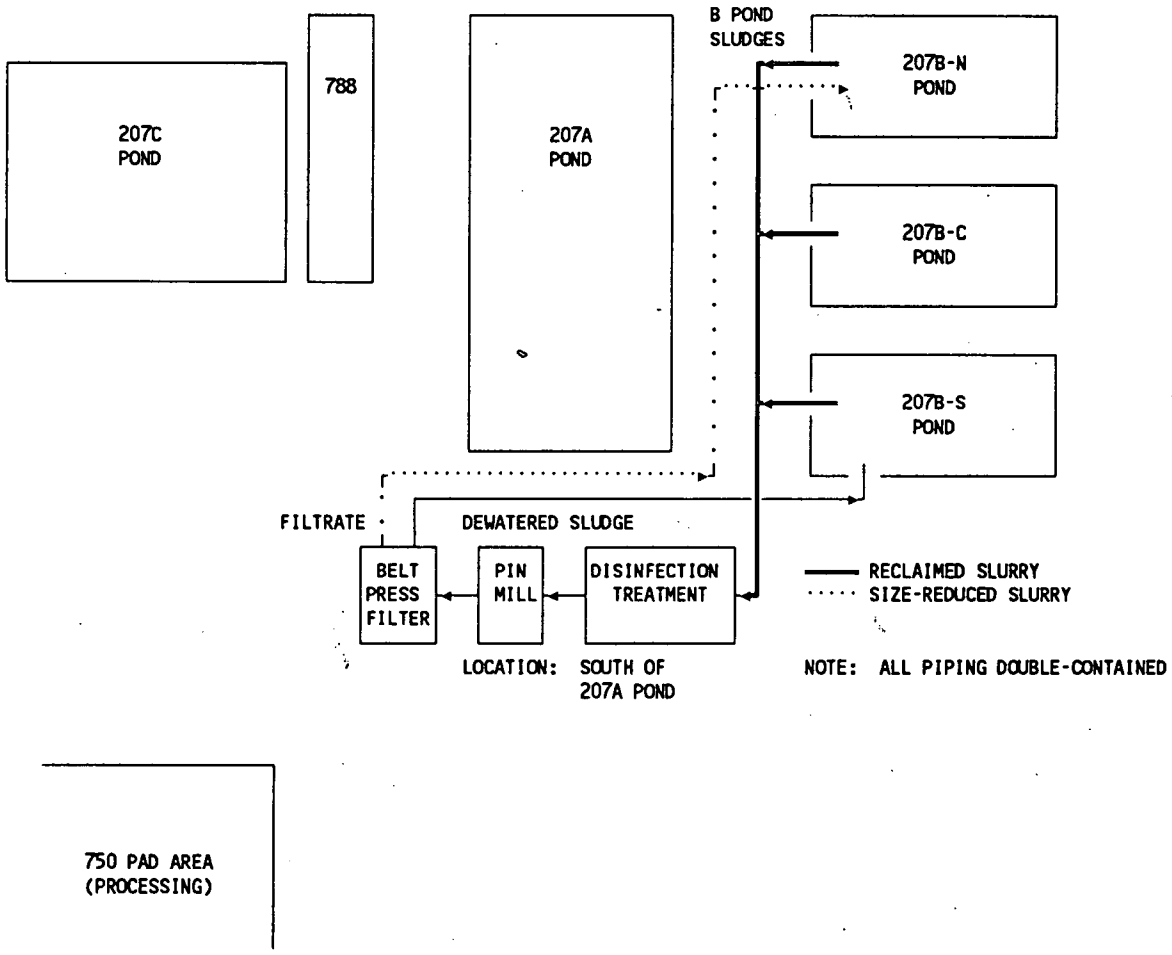
6.1 Equipment List - Stage I Densification (Off-Line Processing)

Ponds 207 A & B

1) Consolidation
   a. Super Sucker Pump
   b. Trash Screen
   c. Sump w/Sump Pump

2) Pre-sizing
   a. 1" Pin Mill Fabricated on a Skid
   b. Sump w/Sump Pump

ATTACHMENT 6
PHASE I DENSIFICATION
PRETREATMENT & WATER MANAGEMENT - INTIAL DEWATERING B PONDS



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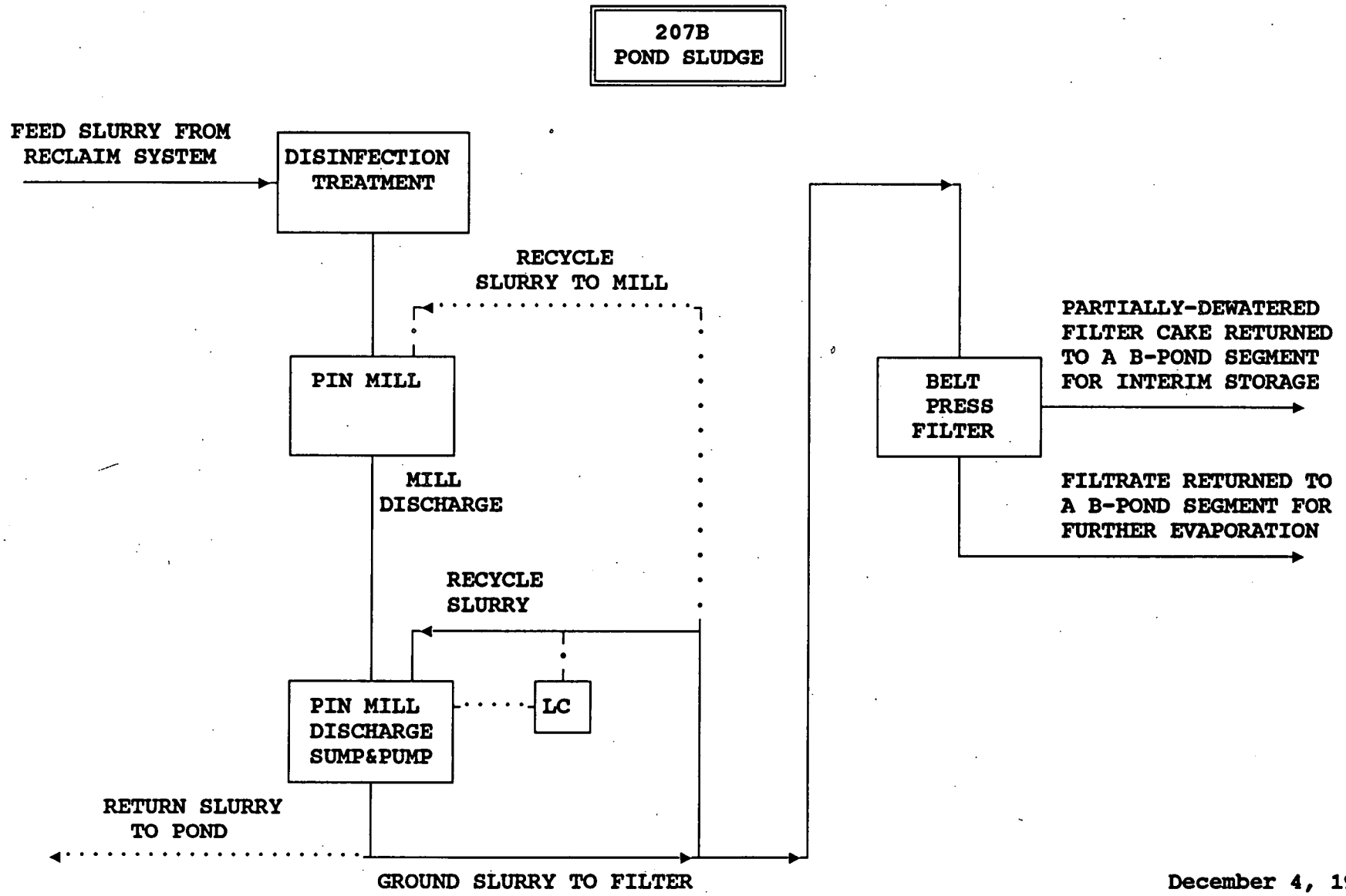
ATTACHMENT 7
PHASE I DENSIFICATION
POND SLUDGE RECLAIM SYSTEM - POND 207B ONLY



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3) Segregation of Trash
   a. Super Sucker Pump
   b. Trash Screen
   c. Sump w/Sump Pump
   d. Trash Boxes (Provided by EG&G)

4) Disinfecting the Sludge
   a. Contact Chamber

5) Preconditioning the Sludge
   a. Lime Addition System
   (May be worked in conjunction with Item 4)

6) Oxidation Step
   a. Ozonization System - 80 gpm input

7) Dewatering
   a. 1-2 Meter Belt Filter Housed in a Self Contained Trailer
   b. Filtrate Sump & Pump to Return Filtrate Water to a Storage Pond
   c. Dewatered Sludge (20-30% Solid) Sump & Pump to Return Sludge to a Storage Pond

8) Storage
   a. Lined Pond to the Determined

9) Utilities
   a. Diesel Generators
   b. Air Compressor

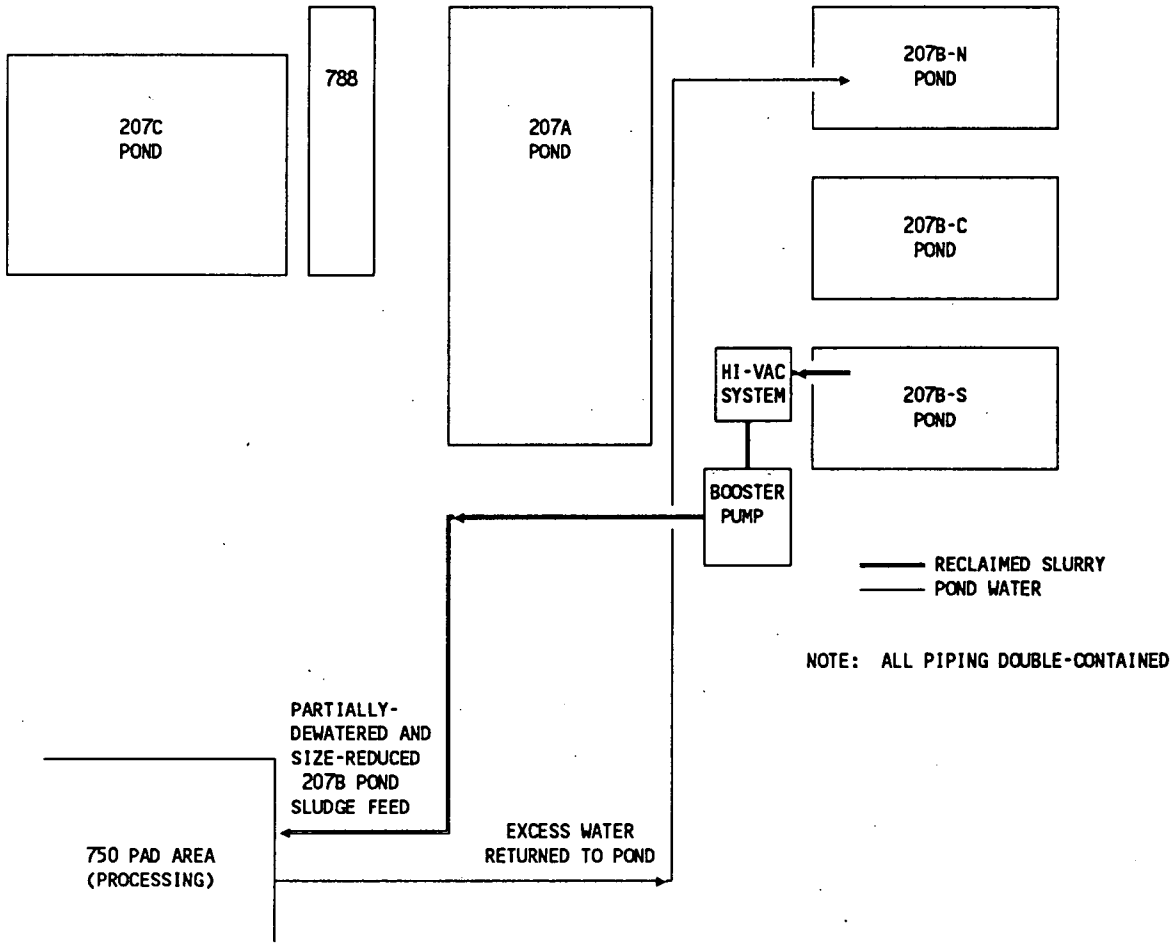
All equipment will be located around the 207 Pond area. See Attachment # 6 & 7 for General Arrangement of Equipment and Piping Arrangement.

6.2 Equipment List - 207 C and Clarifier Sludge - Stage I Densification Step

The Stage I Densification for 207 C will consist of mixing the waters and sludges into a homogeneous mixture. It is envisioned that heat may be used to increase the solubility of the waters to cause the hard crystals observed during sampling to be placed back into solution.

1) Consolidation
   a. Super Sucker Pump
   b. Trash Screen

ATTACHMENT 8
STAGE II - DENSIFICATION & CEMENTING
POND SLUDGE PROCESSING - 207B PONDS WITH LOW-WATER RATIO



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c. Sump w/Sump Pump
d. In-Line Heater with Jet Nozzle

2) Pre-sizing
   a. 1" Pin Mill Fabricated on a Skid
   b. Sump w/Sump Pump

3) Segregation of Trash
   a. Super Sucker Pump
   b. Trash Screen
   c. Sump w/Sump Pump
   d. In-Line Heater with Jet Nozzle
   e. Trash Boxes (Provided by EG&G)

4) Disinfecting the Sludge
   a. Contact Chamber

5) Preconditioning the Sludge
   a. Lime Addition System
   (May be worked in conjunction with Item 4)

6) Oxidation Step
   a. To be determined

7) Dewatering
   (Not applicable for Pond 207 C)

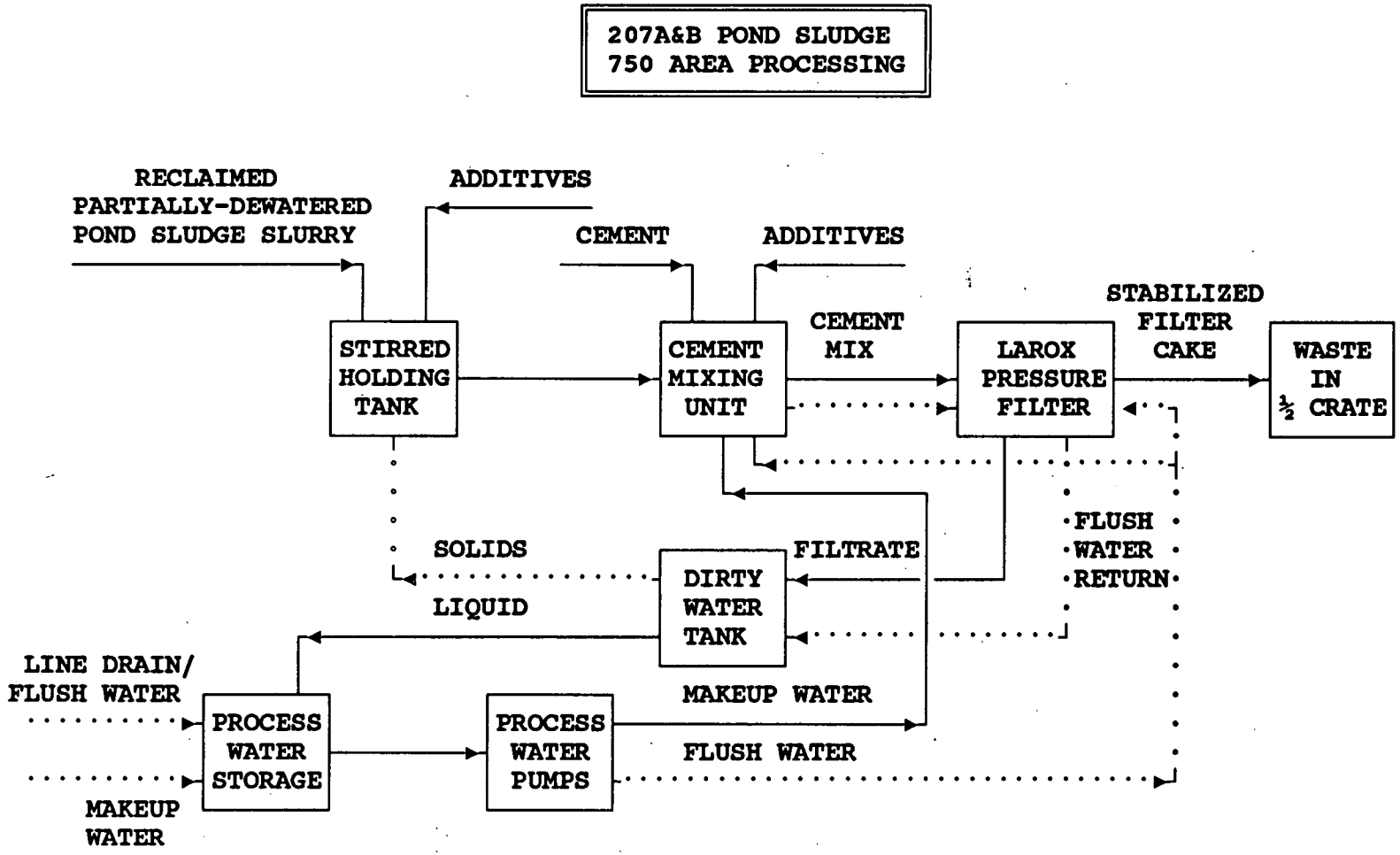
8) Storage
   a. Agitated Portable Tankage with Immersion Heaters

All equipment will be located around the 207 Pond area. See Attachment # 2 for general location and piping configuration.

7.0 Stage II Densification and Cementing

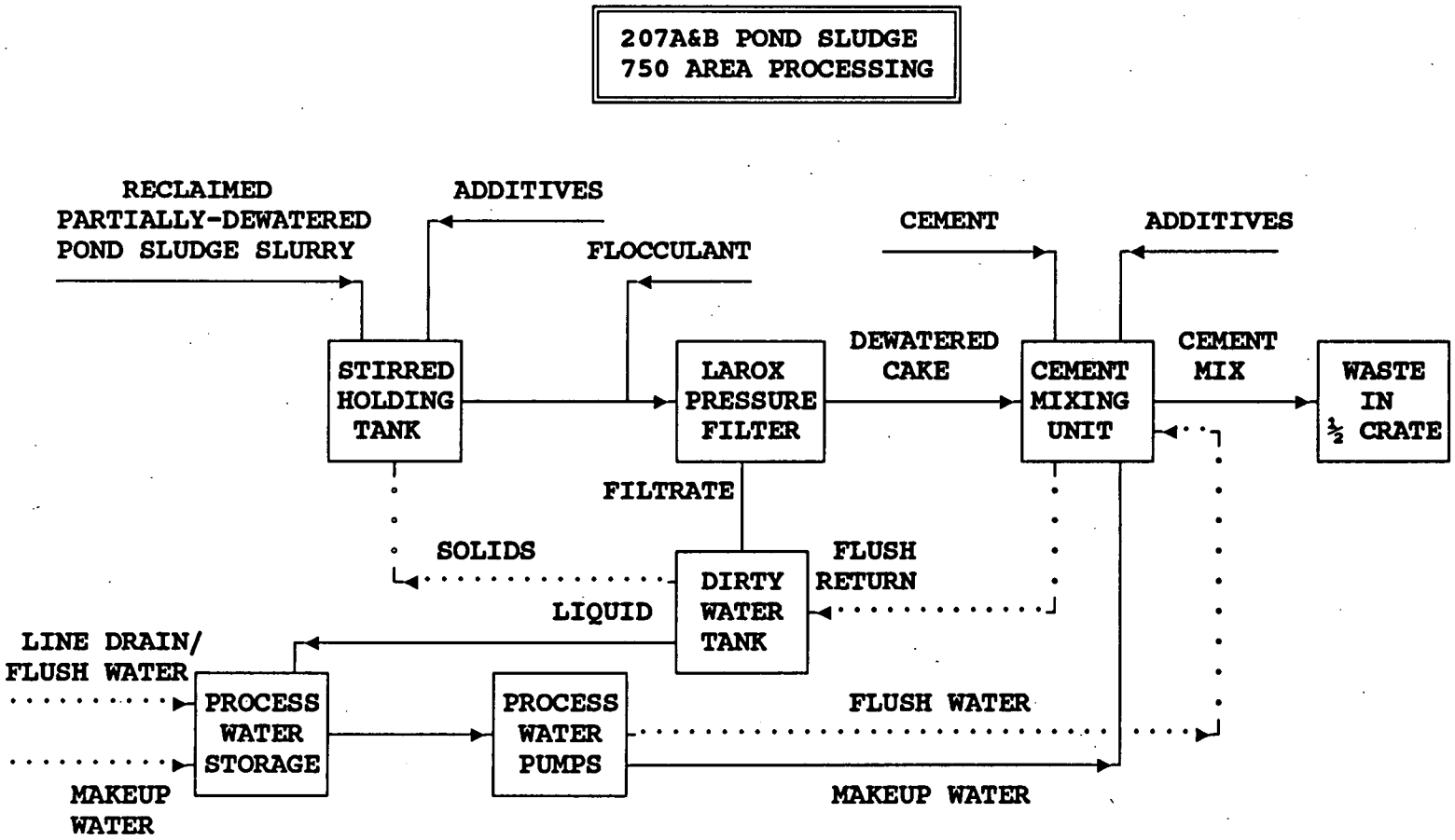
Stage II Densification and Cementing will consist of all operations commencing with the reclaiming of Stage I densified waste from inventory and including all work required to cast the waste into the final waste form. The same equipment process train is envisioned for all pondsludge and clarifier waste. For Pond 207 C a dewatering step is not envisioned to be required. Therefore, the pressure filters are not required to process the 207 C Pond.

ATTACHMENT 9
PHASE II Ddensification & CEMENTING
POND SLUDGE PROCESSING CEMENTING & CASTING
CEMENT ADDITION BEFORE FILTER



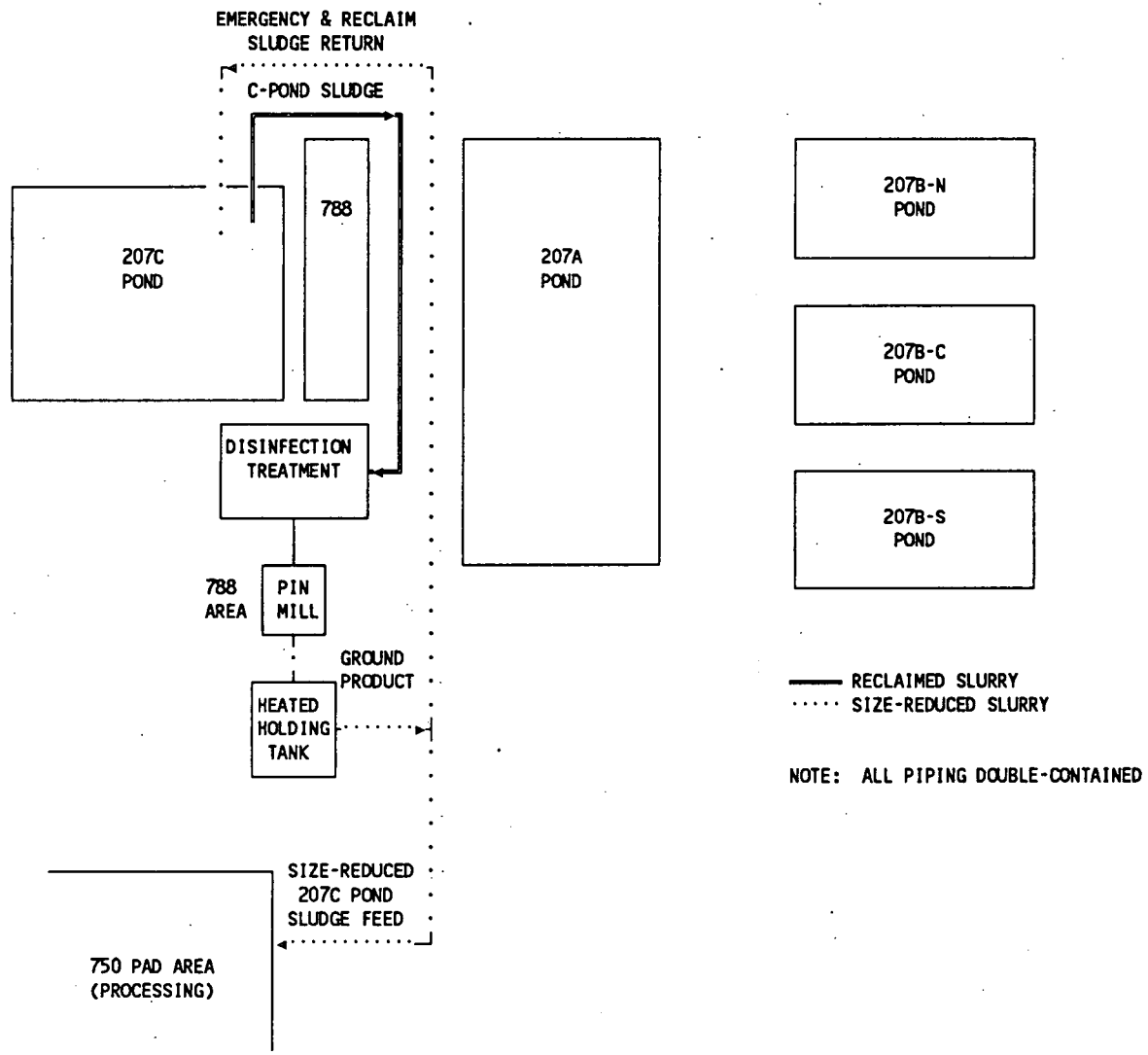
December 4, 1991

ATTACHMENT 10
PHASE II DENSIFICATION & CEMENTING
POND SLUDGE PROCESSING - CEMENTING & CASTING
CEMENT ADDITION AFTER FILTER



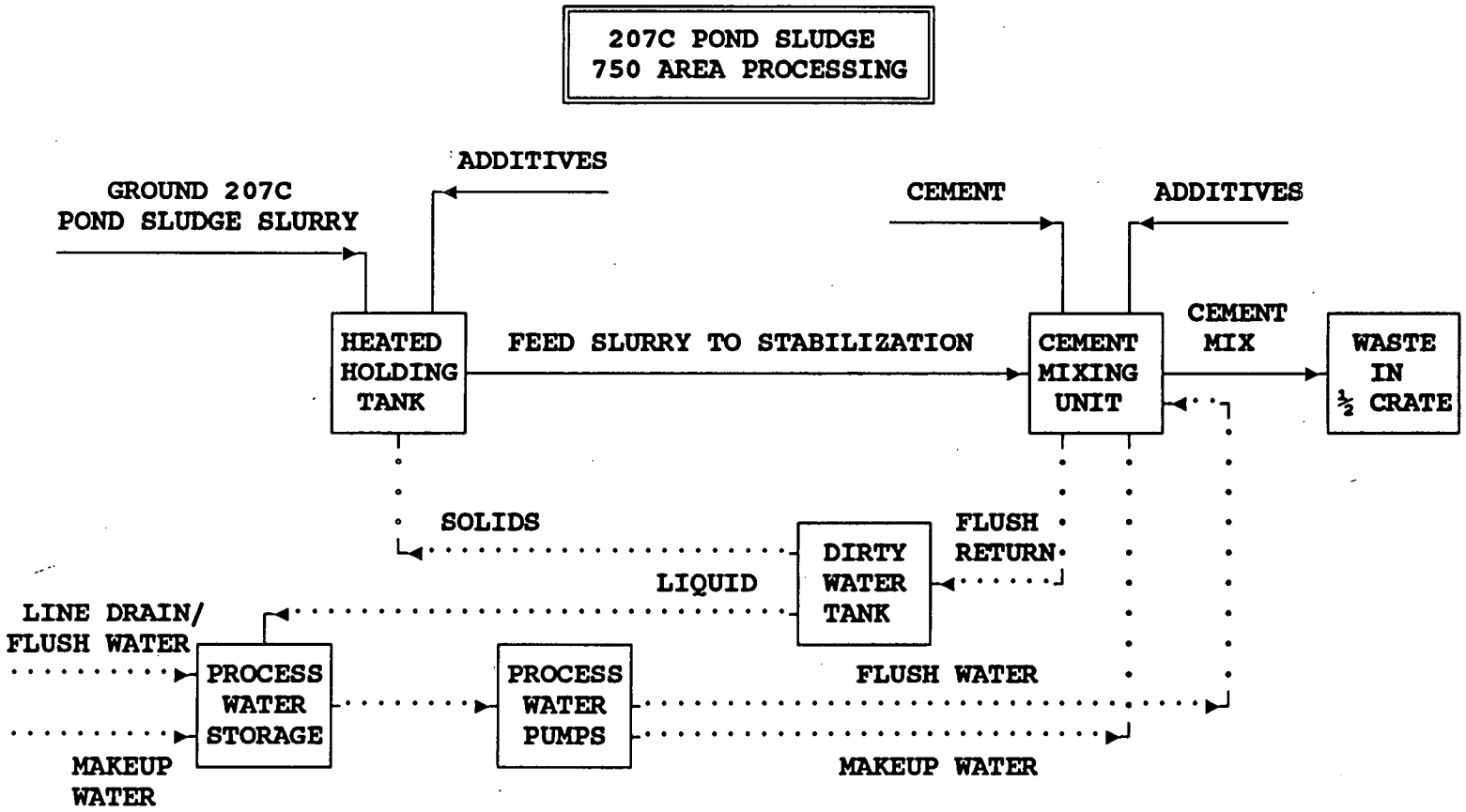
December 4, 1991

ATTACHMENT 11
PHASE II CEMENTING
POND SLUDGE PROCESSING - 207C POND HIGH-WATER RATIO PROCESS



December 4, 1991

ATTACHMENT 12
PHASE II - CEMENTING
POND SLUDGE PROCESSING - CEMENTING & CASTING



December 4, 1991

7.1 Low Water Ratio System

The low water ratio system will be used to process the Pondsludges contained in Ponds 207 A & B Series Ponds, and the Clarifier Sludges.

The system will be contained on the 750 Pad area. The filters will be contained in a Permacon while the tankage and cement storage systems will be contained outside the tents but within the 750 Pad area. All piping systems from the pond areas and filtrate returns to the ponds will be double contained piping systems. All waste will be cast into half crates. Any off-spec waste will be stored and reprocessed on the 904 Pad at the proper period.

The laboratory filtration tests indicate that material dewatered from the pressure filters will be a dry filter cake. The curing stations shown within the Material Handling Study were based on having the material cure for 48 hours prior to securing the plastic liner and installing the half crate lid. This requirement may be reduced once the treatability study results are completed and therefore, will minimize the floor space requirements for the curing station. HNUS does recommend storing the curing half crates in a heated tent during initial curing of the waste.

Currently HNUS has not resolved whether the pozzalonic materials will be added before or after pressure filtration. Additional tests using different body feeds to enhance the filterability of the waste is scheduled to be performed once additional pondsludge samples are received in the laboratory. A Block Flow Diagram showing cement addition before and after filtration is included as attachment # 9 & 10 to represent the different processes currently under consideration.

7.2 High Water Ratio System (Pond 207 C)

A high water ratio system will be used to process 207 C Pond and any residual wastes remaining at the end of Pondsludge Waste Processing. These may include filtrate sludges remaining in 207 B-North during the final cleaning of the filtrate water pond.

The high water ratio system is envisioned to be the same as the low water ratio system with the pressure filters being bypassed. General arrangements for equipment would be similar to those of the low water ratio unit.

Block Flow Diagrams reflecting the configuration of the equipment are shown as Attachment # 11, 12.

8.0 Sludge Densification and Processing Responsibility Matrix

	EG&G	HNUS
Water Management		
. Evaporate Water using Heater Soaker Hoses	X	
. Transfer Water from Pond to Pond	X	
. Evaporate Filtrate Water	X	
. Transfer Waters to Evaporators	X	
. Transfer Residual Waters to 904 Pad for Makeup Water (Tanker Trucks)	X	
Stage I Densification		
. Reclaim Sludge from Ponds		X
. Trash Box Stowage & Transportation	X	
. Disinfecting Sludge		X
. Final Clean-up - Each Pond	X	
. Stage I Densification - Dewatering		X
. Sludge Pond Management	X	
. Furnishing Temporary Power - 788 Area	X	
Stage II Densification & Cementing		
. Reclaim Sludge to 750 Pad		X
. Return Stage II Filtrate Water to Ponds		X
. Cement Sludges		X
. Final Clean-up - (All Ponds)	X	
. Casting and Stowage of Final Waste Form	X	
. Furnishing Power - 750 Pad	X	

9.0 Regulatory Issues

The proposed pondsludge processing scenario raises certain issues that require resolution based upon HNUS understandings of the existing permits affecting the pond areas. EG&G needs to advise HNUS as to the viability. The issues requiring clarification are the following:

1. The laboratory analysis performed to date reflects that a chlorination step is required for pathogen treatment. NVO-325 requires zero pathogens in the final waste form. Filtrate waters from each of the dewatering steps (Stage I & II Densification) will return filtrate water which contains as a minimum 2 ppm of active chlorine to the ponds.

2. To optimize the filterability of the sludges a preconditioning of the sludges will be required. This is anticipated to include the addition of lime to raise the pH of the sludges to 10.5 - 11.5 Thus, filtrate waters will be pH adjusted prior to returning to the pond ares.

3. The smaller quantities of miscellaneous sludges (207 A & clarifier) will require temporary tankage or metal containers to be available for short term storage after Stage I Densification. Anticipated storage between Phase I Densification and Phase II Densification and Cementing into final waste forms is anticipated to vary between 1 to 3 months.

The scheduled completion for having the ponds "clean and dry" and processing the contained waste is November 8, 1992. Every effort must be made to accomplish this goal. HNUS recommends actions to simplify the processing of these wastes. These include:

1) Re-permit the A Pond and B Pond Management Areas into one RCRA Permit Area.

2) Consider the A and B Pond Waste as one waste form.

The current restrictions placed by the management areas are not conducive to making decisions that minimize costs and protect the environment. The existing conditions of the pond liners is a consideration in determining the safest method to store sludges and pond waters. If repermitting is allowed, HNUS recommends that A & B Pond Sludges be consolidated and densified into Pond A and the pond waters and filtrate waste from A & B Series Pond be placed in Pond 207 B-South. Potential regulatory concerns which HNUS has related to the Water Management Program and the processing of pondsludge are addressed in Section 9 of this document.

Appendix

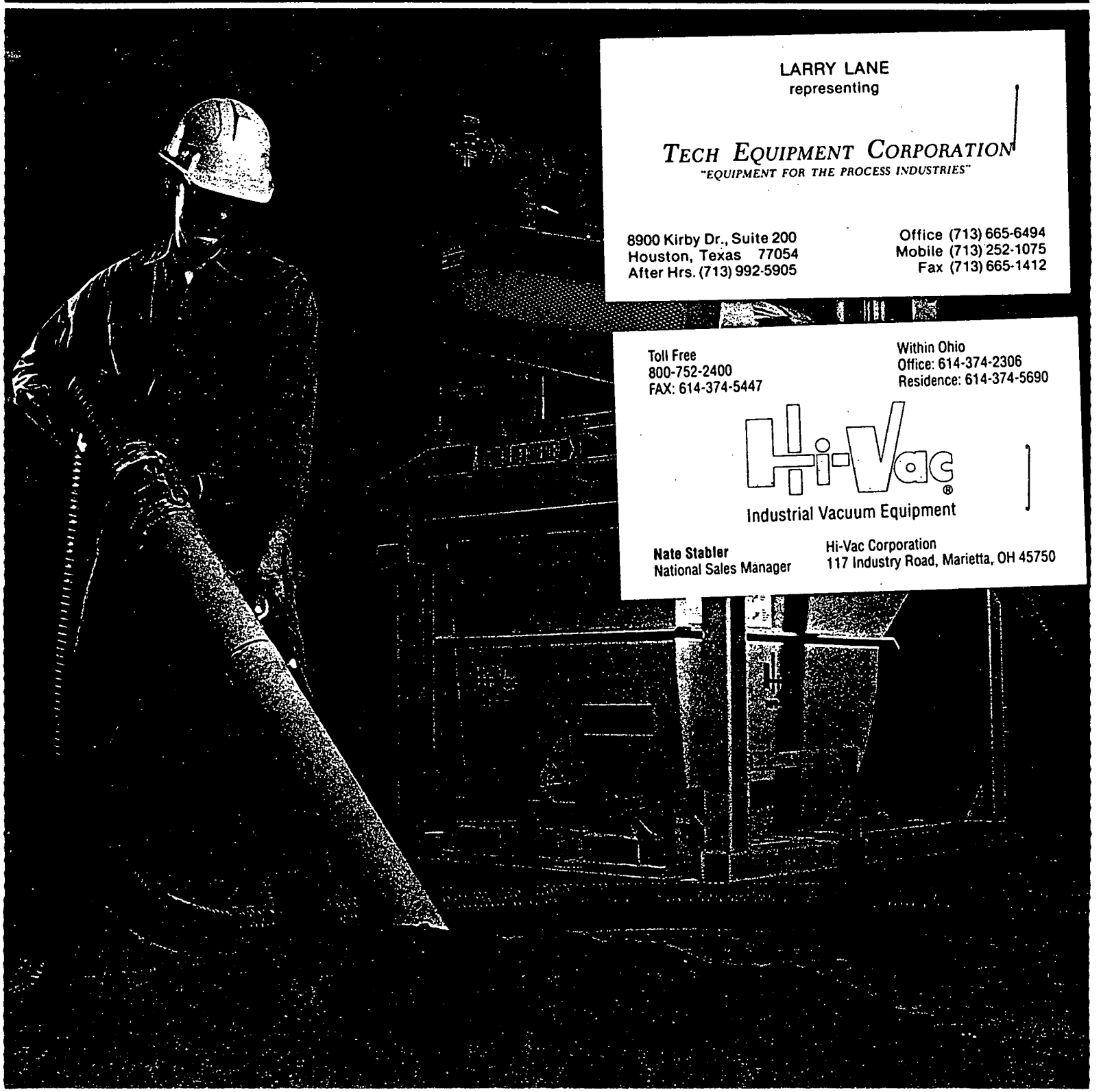
Appendix 1 Tom Snare Letter - Observations from Preliminary 207 C Treatability Study - Dated 12-3-91

Appendix 2 Review of Commercial Chlorine Chemicals

Appendix 3 Technical Brochures of Super Sucker Equipment

Hi-Vac®

vacuum cleaners and conveyors



LARRY LANE
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TECH EQUIPMENT CORPORATION
"EQUIPMENT FOR THE PROCESS INDUSTRIES"

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Hi-Vac®
Industrial Vacuum Equipment

Nate Stabler
National Sales Manager

Hi-Vac Corporation
117 Industry Road, Marietta, OH 45750

Hi-Vac will cut your cleanup

It's been proven hundreds of times...Hi-Vac saves money.

In fact, most Hi-Vacs pay for themselves in less than six months through savings in labor costs and reclaimed materials.

Hi-Vac handles the toughest cleanup jobs

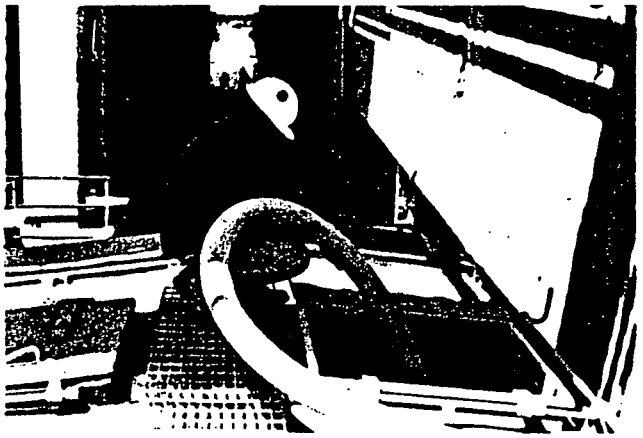
Use Hi-Vac to pick up solids, powders, liquids, slurries... any material that will flow through a hose.

With its long reach—up to 2000' (610 m)*—and powerful suction—up to 18" (457 mm) of mercury—Hi-Vac cleans out deep pits, dust collectors, catwalks, holds, conveyors, ducts, elevators, and other hard-to-reach spots.

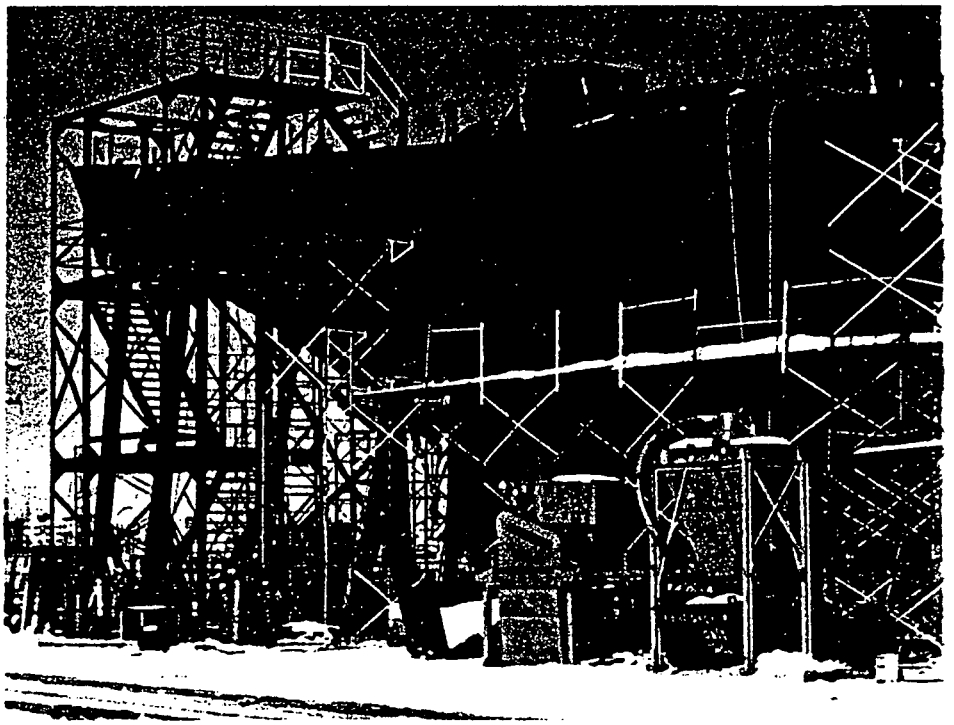
Hi-Vac reduces labor costs

In hours, Hi-Vac can do cleanup jobs that broom and shovel crews need days to do. And there's no sweeping dust.

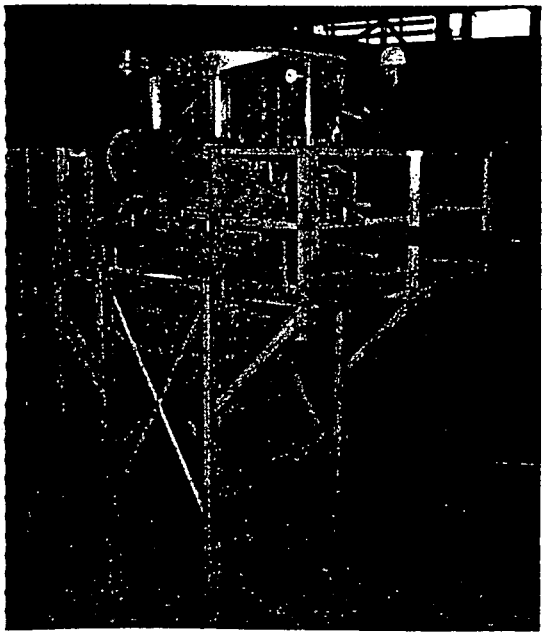
Hi-Vac cleans out stalled equipment fast to allow immediate repairs. It can even be used under operating machinery. Overtime is reduced or eliminated because



1 Excess material is easily removed from covered hopper cars without dust or spillage. In one hour, one man with a Hi-Vac can remove overloads that used to take half a day of shoveling by a crew of several men. Material is easily recycled.



2 Shipbuilder's Hi-Vac quickly paid for itself through reduced labor costs and sand reclamation. Hi-Vac removes blasting sand from holds and compartments. Intercept hopper at right collects 90 to 95% of the sand for reuse, while fines and dust are collected in the hopper under the "Powerhead."



3 Hi-Vac has cut in half the cost of removing heavy, wet sand from these 24" high pressure chambers at a water treatment plant.

4 Bottom dump hopper allows nearly continuous operation. Vacuumed material can be discharged to a conveyor, truck, storage bin, etc. Optional service platform gives access to the Hi-Vac "Powerhead" for maintenance.

costs Hi-Vac

-Vac can do most of your cleanup jobs during regular rking hours without production shutdowns.

-Vac reclaims materials

sers report saving thousands of dollars by vacuuming and reclaiming valuable materials such as conveyor ills, steel shot, blasting sand, cullet, alumina, etc.

When material can be reused, an intercept hop-r (see photo 2 and page 8) can be installed in the cuum line. Dust and fines are separated from the aterial and collected at the Hi-Vac "Powerhead."

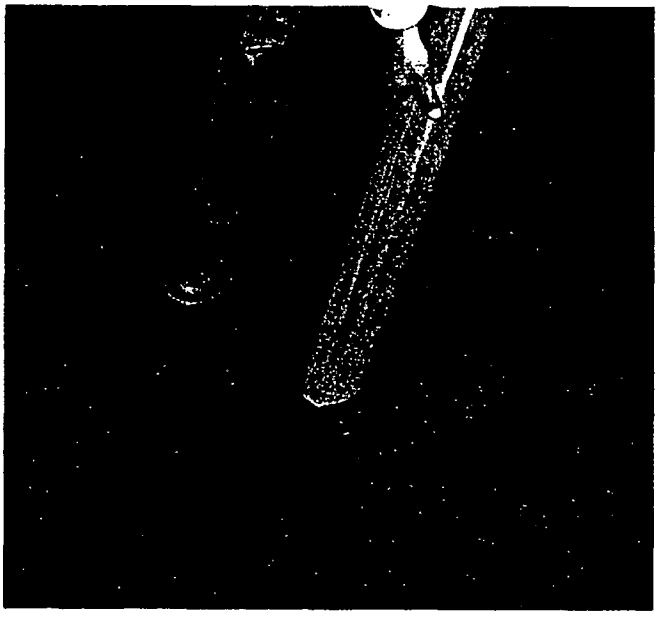
Hi-Vac is portable or permanent

Hi-Vac can be moved to the cleanup job by forklift or crane. Optional wheels, tow-hitch packages, and self-propelled Hi-Vac models are also available.

Or Hi-Vac can be incorporated into a plant-wide central vacuum system (see page 4) for cleanup at several locations.

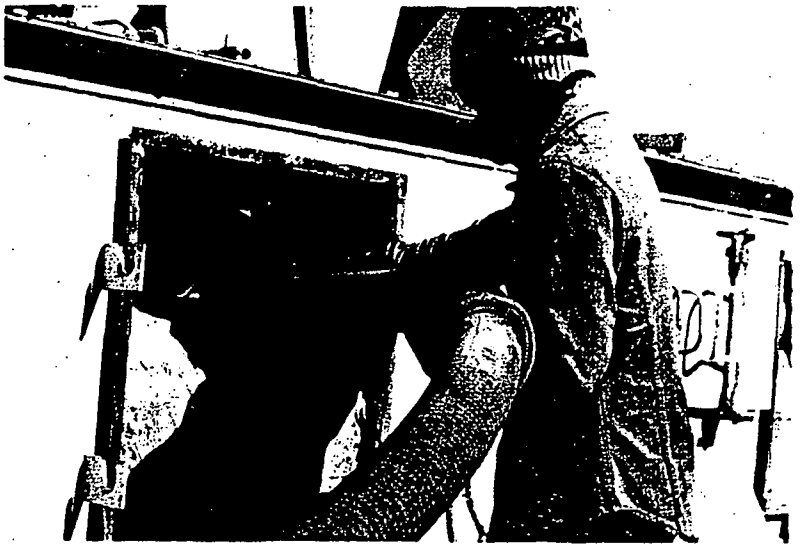
*Depending on material. See capacity chart.

5 Formerly, a five-man broom and shovel crew took 10 days to clean out this elevator pit. Now, two men and a Hi-Vac do it in three days.



6 Hi-Vac's patented 3-stage separation/filtration system allows cleanup of wet and dry materials at the same time, without a mechanical switchover or bypassing any filters.

7 Railroad can charge higher rates for its boxcars after they've been thoroughly cleaned out with a Hi-Vac.



8 Spillage under conveyor idlers is cleaned out in 25% of the time it used to take a broom and shovel crew.

manifold systems for plant-wide

Use Hi-Vac to power a central vacuum cleaning or pneumatic conveying system. Engineering assistance is available to help you design a system tailored to your specific needs.

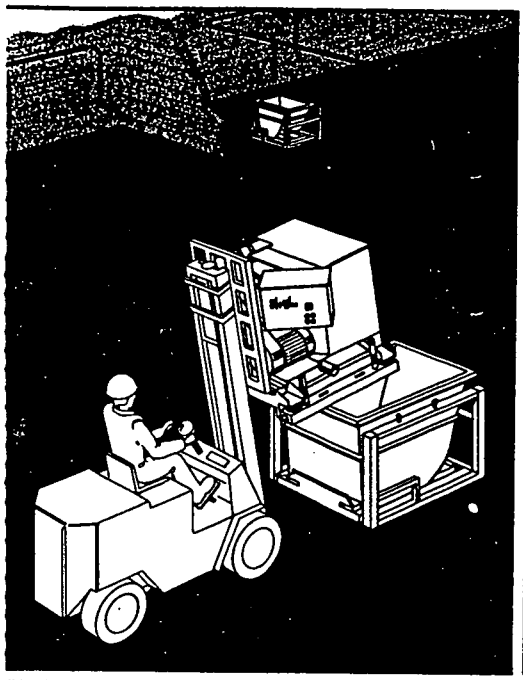
Central vacuum cleaning systems

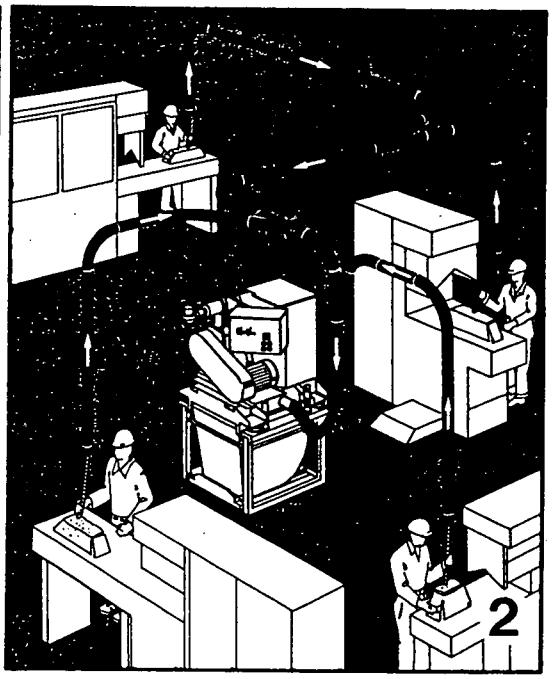
Where a number of plant areas require frequent cleanup or are inaccessible, a Hi-Vac central vacuum cleaning system may be the answer.

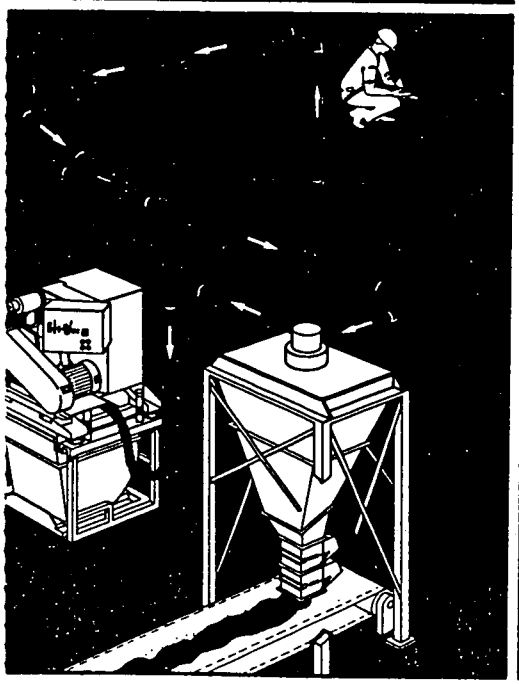
Manifold piping can put Hi-Vac's pickup power to work at multiple points simultaneously. Use it to pick up chips at machining stations, vacuum loose sand from molds, replace compressed air blow-offs, remove fly ash from collectors and precipitators, clean out strings of boxcars, recover sand from tunnel systems and pits.

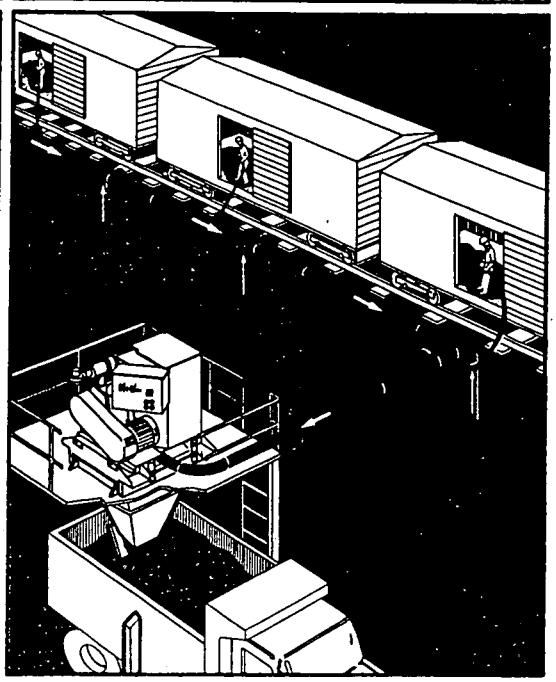
The piping can run for hundreds of feet in any direction. Remote controls allow operators to turn the system on and off as needed.

The Hi-Vac powering the system can be portable or installed permanently. Portable units can be unhooked and used for general plant cleanup or for other manifold systems.









Central Vacuum Cleaning Systems

1. One Hi-Vac can serve several manifold systems within a plant or in other buildings. The unit can be towed or carried by forklift or transported by crane with optional lifting eyes. Self propelled Hi-Vacs are also available (see page 10).

2. On a production line a Hi-Vac manifold system can clean dust and sand from molds, remove machining chips, pick up spills, etc. Inlets can be adapted to production machinery such as cutting heads.

3. An intercept hopper is used in manifold systems where the material being picked up is to be reclaimed. Most of the material drops out of the airstream into the hopper. Dust and fines continue on and are collected at the "Powerhead."

4. A manifold system is ideal for cleaning out several rail cars, trucks, or barges at one time.

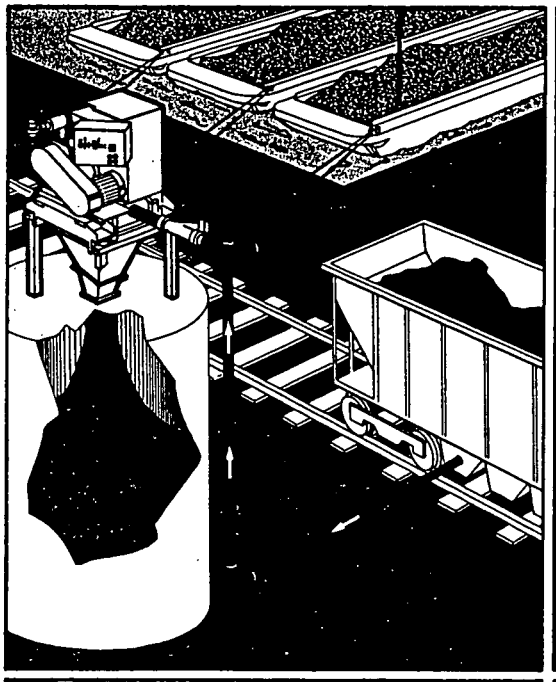
cleanup or conveying • Hi-Vac

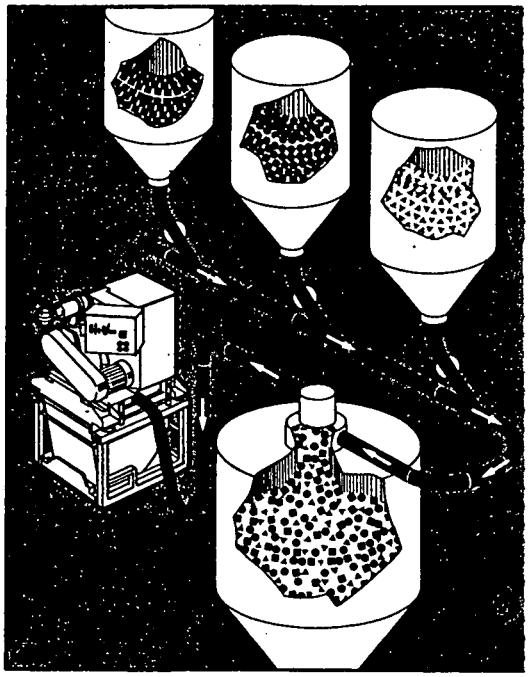
'neumatic conveying systems
'ut a Hi-Vac to work transporting bulk materials around our plant. In one compact "Powerhead", Hi-Vac combines all the components of a vacuum conveyor: vacuum pump, motors, control panel, dust collectors, level robe, and protective devices.

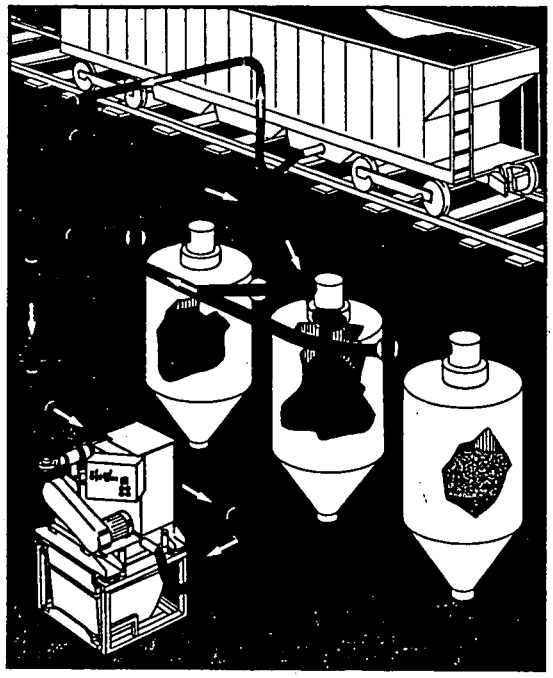
You get a pre-packaged, pre-engineered, pre-sted and run unit that costs far less to install and takes p only a fraction of the space of conventional vacuum onveying equipment.

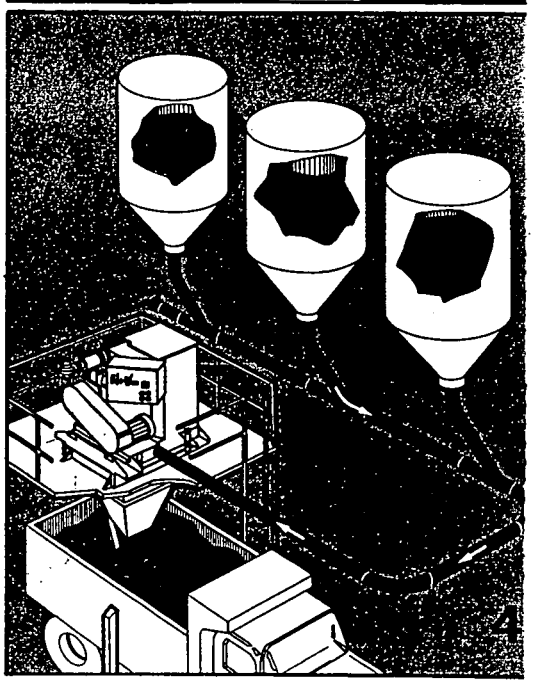
Of course, Hi-Vac offers all the advantages of vacuum conveying — multiple point pickup, car unloading without a pit, freedom from contamination, and zero dust or spillage.

The Hi-Vac "Powerhead" can be installed permanently, or a portable unit can be utilized allowing one Hi-Vac to serve several conveying systems or be used for cleanup applications.









Pneumatic Conveying Systems

1. Hi-Vac can unload hopper cars and other bulk transporters without the need for a pit. Conveying capacities up to 200 tons per hour are available, depending on the material.

2. As a vacuum conveyor, Hi-Vac is ideal for picking up materials from multiple points for delivery to a single location. The "Powerhead" can be unhooked for general cleanup or use with other conveying systems.

3. With proper valving, one Hi-Vac can convey materials to multiple locations, doing the work of several pressure transporters. Fines can be left with the material, or collected at the "Powerhead."

4. Use a Hi-Vac to load conveyors, bins, trucks, rail cars, barges, etc. A variety of hopper and gate configurations is available for batch, semi-continuous, or continuous discharge (see page 8)

w/Jig

exclusive "Powerhead"

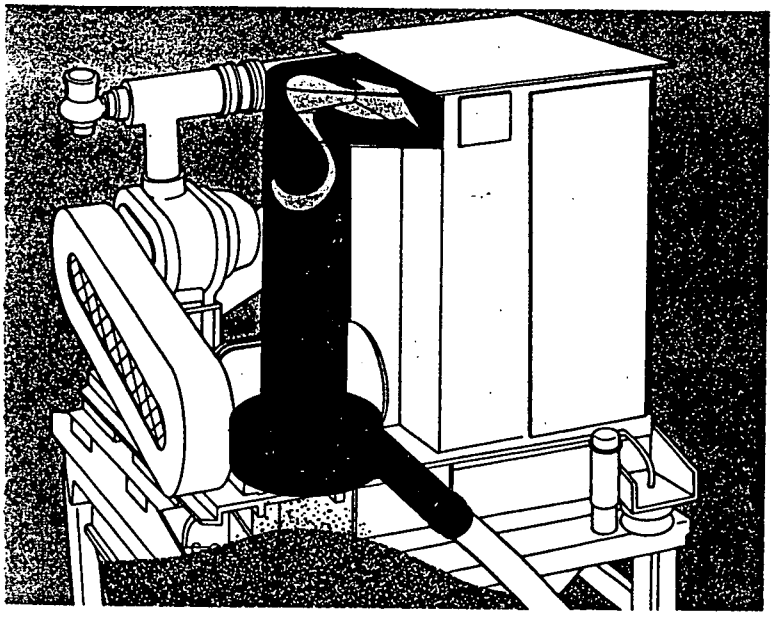
All major components of a Hi-Vac are contained on a rugged, compact chassis called a "Powerhead." These include the vacuum pump, motor, controls, level sensor, and three stages of separation.

Each "Powerhead" is delivered pre-tested and incorporates the patented technology proven in over 1500 Hi-Vac installations throughout the world.

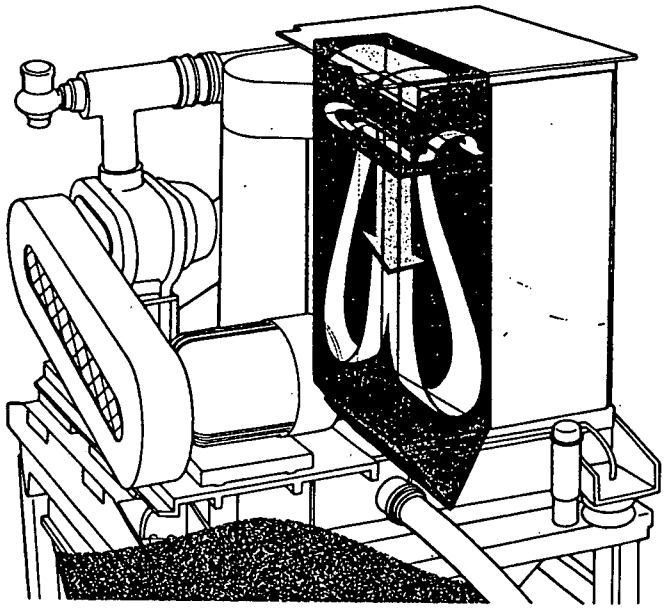
High vacuum, low horsepower

Hi-Vac utilizes a positive displacement vacuum pump for highest vacuum—18 inches (457 mm) of mercury—with minimum horsepower. Suction rises with increased hose loading (a characteristic of PD pumps), unlike centrifugal fan-type units which operate efficiently only when being fed material at a constant rate.

The virtually constant air volume displaced by Hi-Vac's vacuum pump prevents the plugging that commonly occurs when fan-type vacuum cleaners are suddenly overloaded.

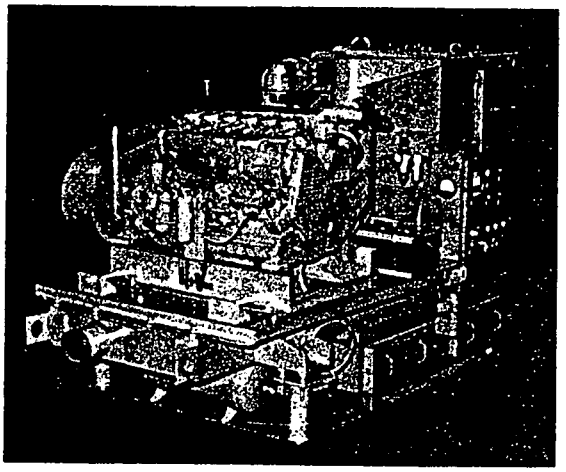


The **centrifugal separator** is the first of Hi-Vac's three filtration stages. Material is drawn through the line into a circular chamber where it spins out of the air-stream. Partially cleaned air rises up the stack to the...

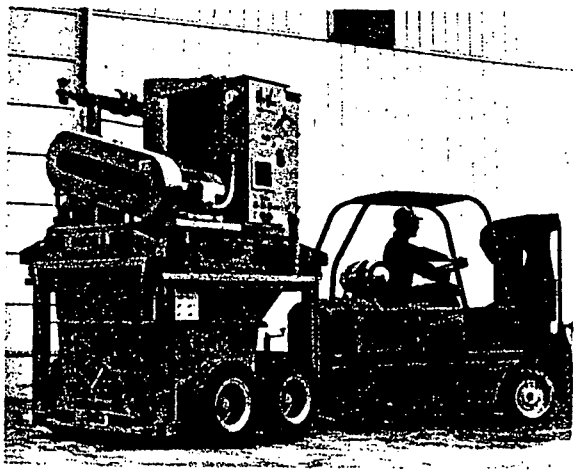


linear separator for removal of moisture and abrasive dust. It is drawn at high velocity through the narrow slot on top. Entering the larger chamber, it slows down, dropping dust particles to the bottom. Any remaining material is trapped in the...

The Hi-Vac control panel includes a solid state read-out which indicates the status of the unit for trouble-shooting, if ever required.



For applications where electric power is not available, Hi-Vac "Powerheads" can be provided with gasoline, LP-gas, or diesel engines.



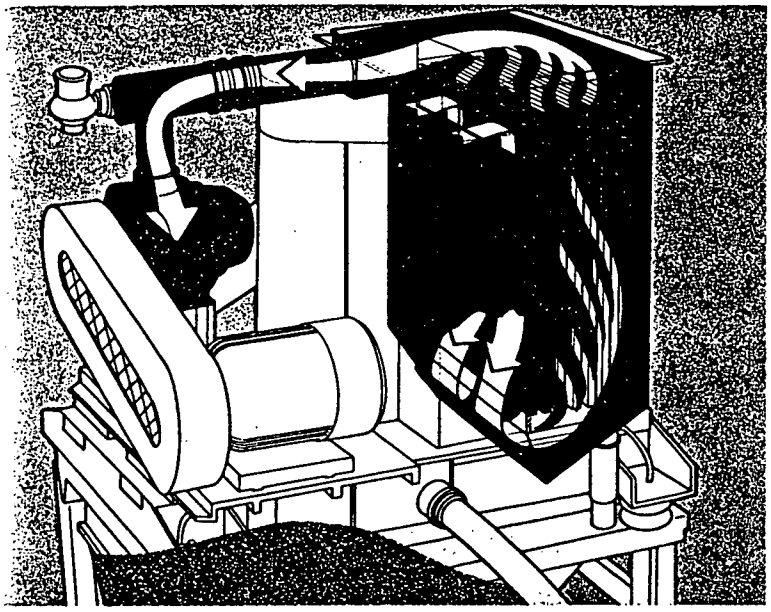
Trailer stands are available for most Hi-Vac models.

design Hi-Vac

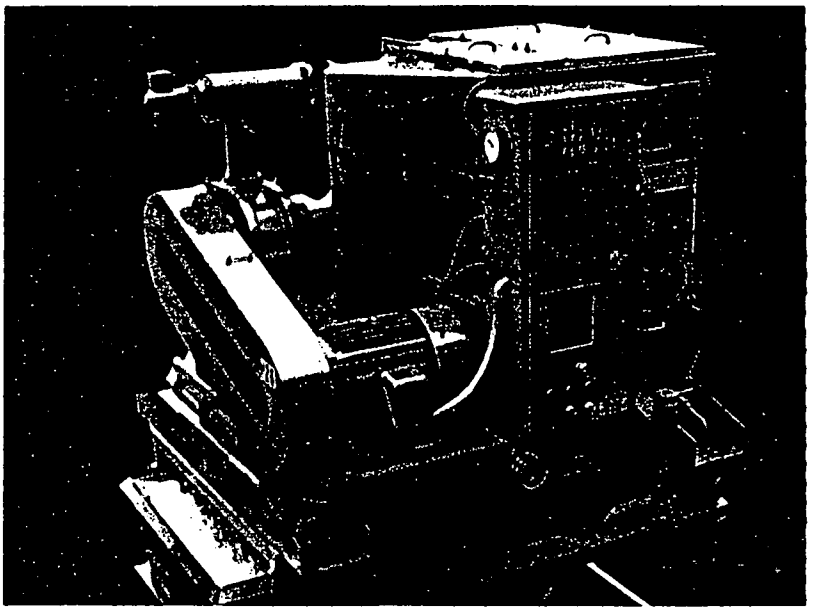
multaneous wet and dry pickup
-Vac's patented three stage filtration system (see be-
w) allows pickup of wet and dry materials at the same
ne, without bypassing filters or a mechanical switch-
er. This assures constant protection for the vacuum
mp and minimum particulate discharge into the air.

ditional "Powerhead" features
-Vac "Powerheads" contain several important safety
d operating features as standard equipment: high
el probe that shuts down unit when hopper is full;
automatic bag shaker with solid state timer that cleans filter bags after every use; vacuum pump protection system that shuts down "Powerhead" in the event of dust passage, temperature overload, or low oil level; vibration isolators to help maintain low noise level.

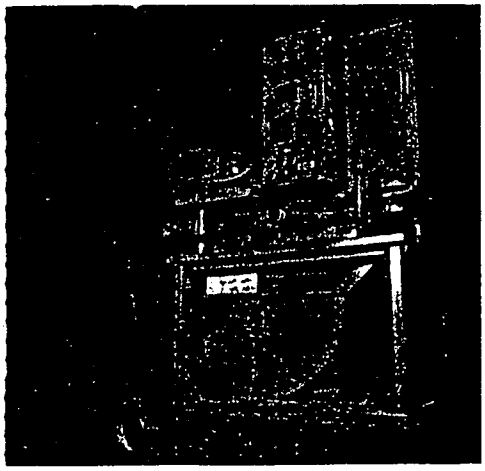
Wide range of pickup capacities
Hi-Vacs are available with capacities up to several hundred tons per hour. Conveying distances up to 2000 feet can be achieved depending on the material to be conveyed.



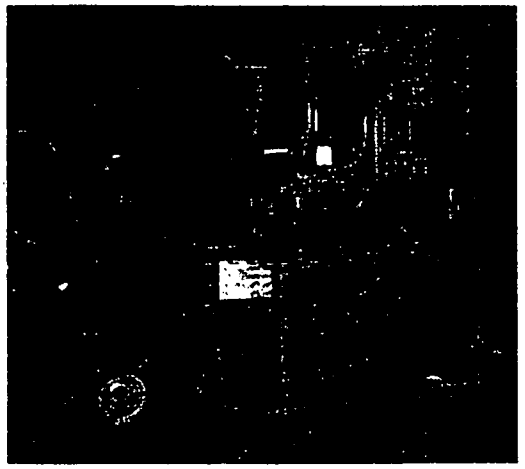
final cloth dust collector which filters out virtually all submicron particles. Cleaned air then passes to the vacuum pump and is exhausted through the silencer. An automatic bag shaker is activated every time the Hi-Vac unit is shut down.



A level probe in the "Powerhead" detects a full hopper and shuts down the unit automatically. Airlift bags raise the "Powerhead" six inches to allow hopper removal. Hoppers can be alternated to provide almost continuous operation.



A forklift truck is all you need to transport Hi-Vac around your plant. Carry the "Powerhead," hopper, and stand... or lift just the "Powerhead."



Full hoppers are removed by forklift and carried to the dump site. Two hoppers can be alternated for almost continuous operation.

stands and hoppers

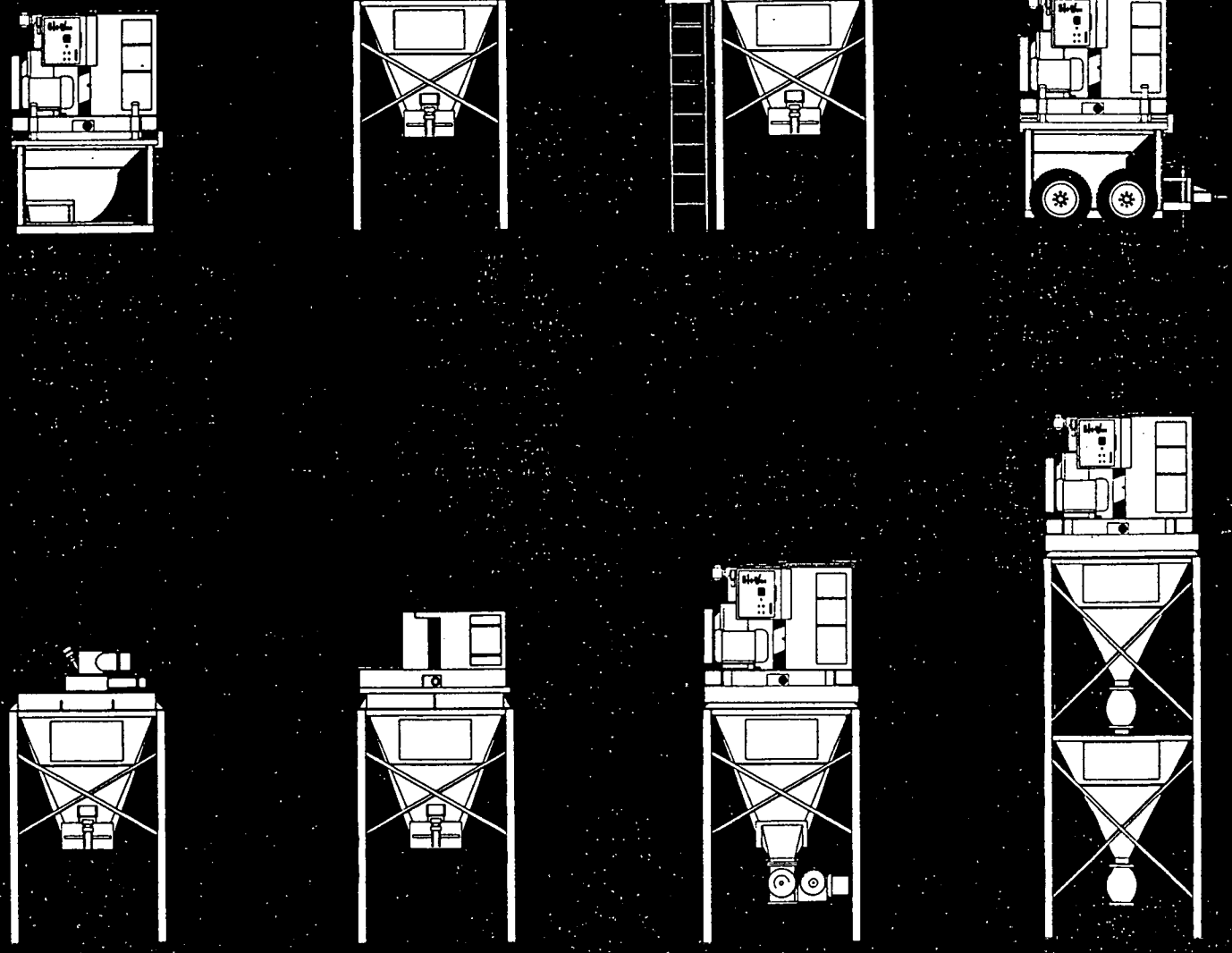
A variety of self-dumping hoppers, trailers, stands, intercept hoppers, and discharge arrangements are available as standard items.

NFE engineers will also design custom hoppers, piping systems, and mounting arrangements to meet your specific requirements.

"Powerhead" design offers flexibility

Because most Hi-Vac "Powerhead" models share the same base dimensions, they will fit on any of the hoppers and stands shown.

It is possible to position several different hoppers throughout a plant and move one Hi-Vac from place to place by forklift or crane.



model 310 and 320 Hi-Vac

These small vacuums are engineered for your big cleanup and conveying jobs.

Model 310 is equipped with a 10 HP electric motor, Model 320 with a 20 HP motor. Their positive displacement vacuum pumps create up to 18" (457 mm) of mercury suction—enough to handle any material that flows. Hi-Vac's exclusive three-stage filtration allows you to pick up liquids and slurries along with dry materials—without having to stop and switch to a "liquids mode".

One man can tow it anywhere

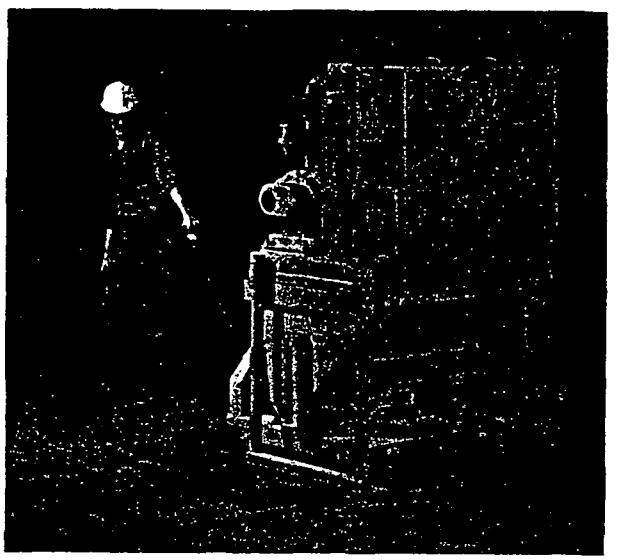
The hand truck that comes with these units allows easy towing to the cleanup site. Its manual hydraulic lift raises and lowers the 10 cubic foot (0.28 m³) collection hopper and removes it for dumping.

With over a 100 foot (30 m) reach, these Hi-Vacs let you clean out deep pits, catwalks, inside dust collectors, sumps, under operating machinery—places no broom or shovel can go.

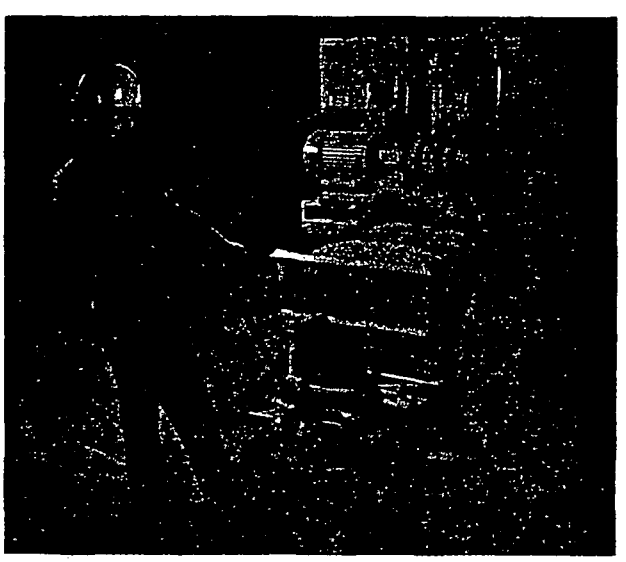
Easy, dust-free conveying

For pneumatic conveying applications, the Hi-Vac "Powerhead" can be mounted on a permanent collection hopper with batch or continuous discharge devices. Material is picked up through the hose or permanent piping and discharged to bins, conveyors, rail cars, etc.

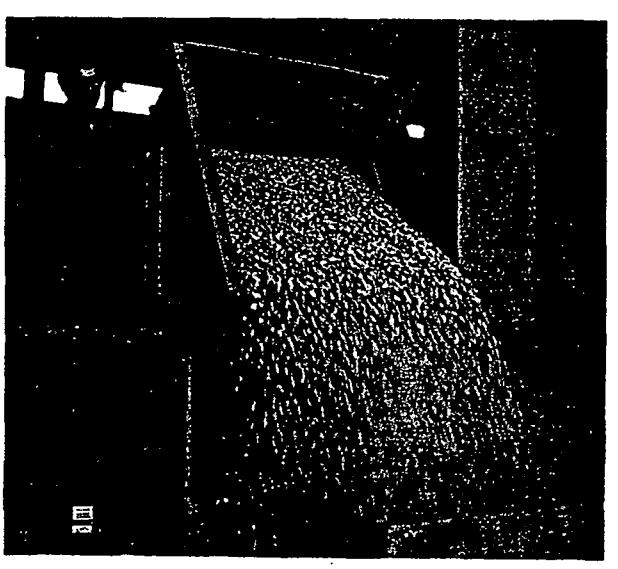
Like all Hi-Vac's, these units will suck up wet and dry materials simultaneously, without having to stop and switch from a dry to a liquids mode.



A hand truck with a manual hydraulic lift makes it easy to tow these vacuums to the cleanup site.



When the hopper is full, the Hi-Vac shuts down automatically and the hopper is removed for dumping.



The 10 cubic foot (0.28 m³) collection hopper is self-dumping when the latch is released.

mobile Hi·Vacs

All Hi-Vac vehicles incorporate a patented three-stage filtration system for simultaneous wet and dry pickup, positive displacement vacuum pumps, single point discharge of all collected material, and many other exclusive convenience and product protection features for reliable, low-maintenance operation.

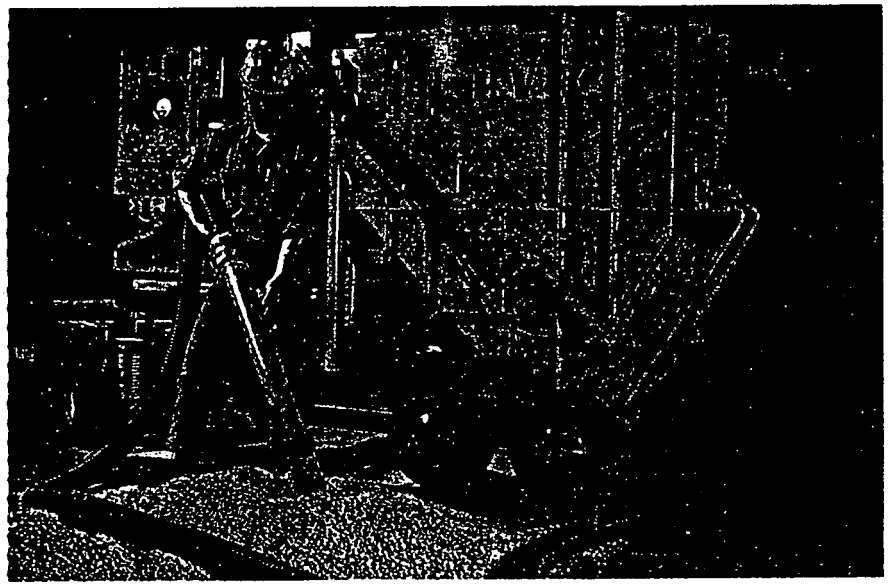
Mobile Hi-Vac

Until now, the only place mobile vacuums could dump collected material was right back on the ground from a height of about a foot.

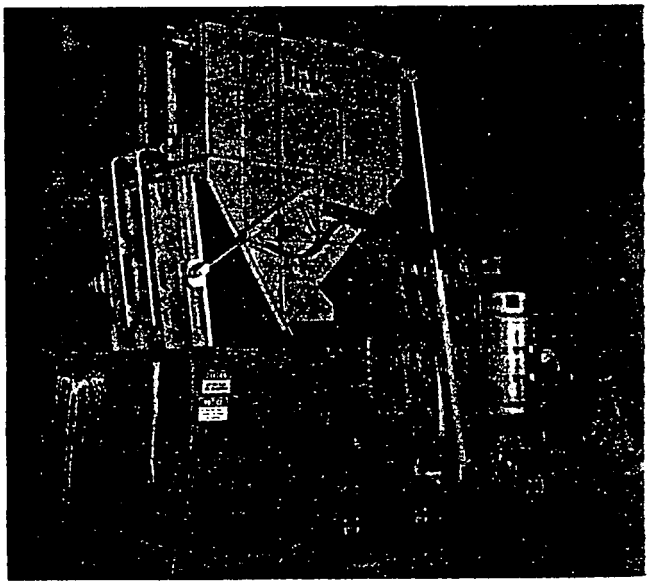
The new Mobile Hi-Vac is the first with a hydraulic lift and tail gate, so you can raise the 1 m^3 (1.3 yd^3) hopper and unload onto conveyors, storage piles, bins, trucks, etc. It's available in 20, 40, or 75 HP versions, as a trailer unit or mounted on your truck.

Hi-Vac T-75 truck module

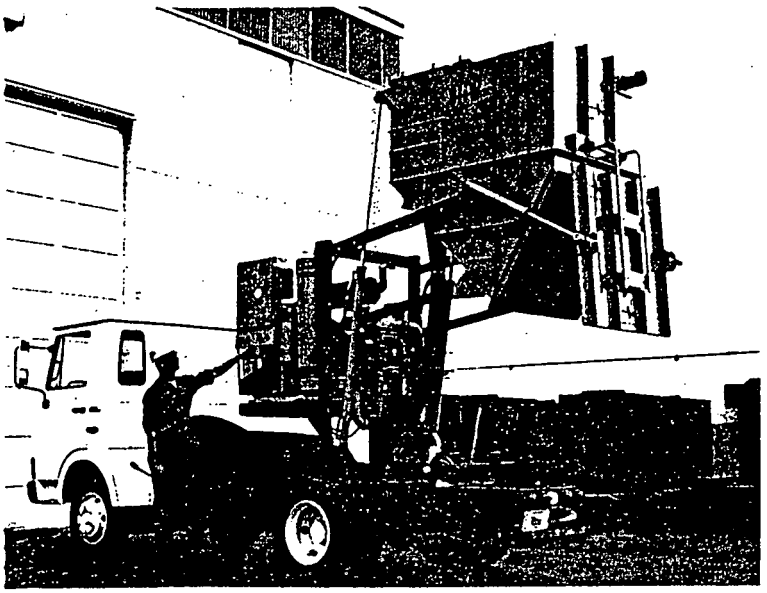
For high-volume cleanup, a complete vacuum loader module is available to mount on your own truck chassis. It includes a hydraulic lift, 75 HP diesel or gasoline engine, positive displacement vacuum pump, controls, and filtration systems. The 9 yd^3 (6.9 m^3) collection box has a patented double floor design that discharges all collected material (including dust and fines) out the tail gate.



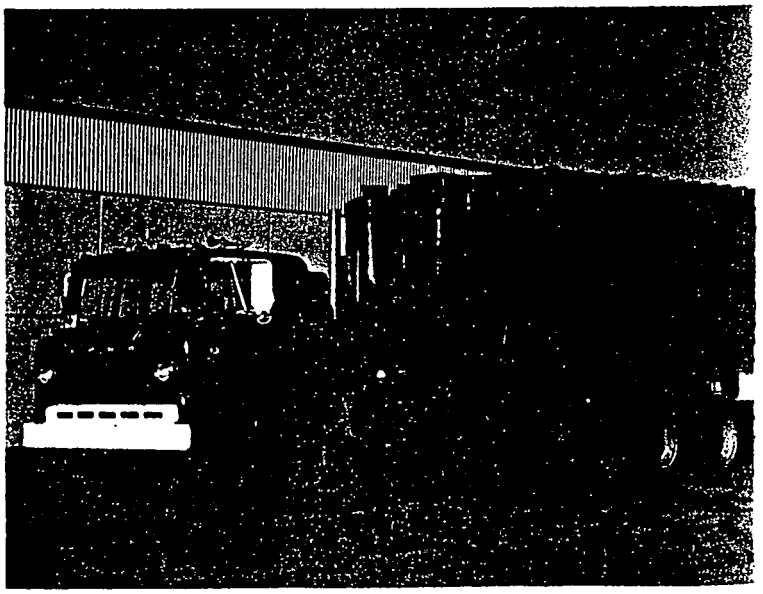
Mobile Hi-Vac comes in 20, 40, and 75 HP versions. It can be towed in-plant by a utility vehicle or fork lift, or on the highway by a small pickup. Mounted on a truck chassis (below), the collection box can be raised to 7', high enough to discharge into a standard dump truck.



The hydraulic lift and tail gate permit dumping at any height up to 4' 6".



The Hi-Vac T-75 module is a complete vacuum loader, ready to mount on your own truck chassis.



2000 series Hi-Vacs Hi-Vac

When you've got to move high volumes of material over long distances, you won't find a more powerful or dependable vacuum loader than one of these big Hi-Vacs.

They're available in 200, 150, 100, and 75 HP versions. The biggest can transport over a ton of material per minute and its maximum conveying distance is well over 1000 feet (305 meters)!

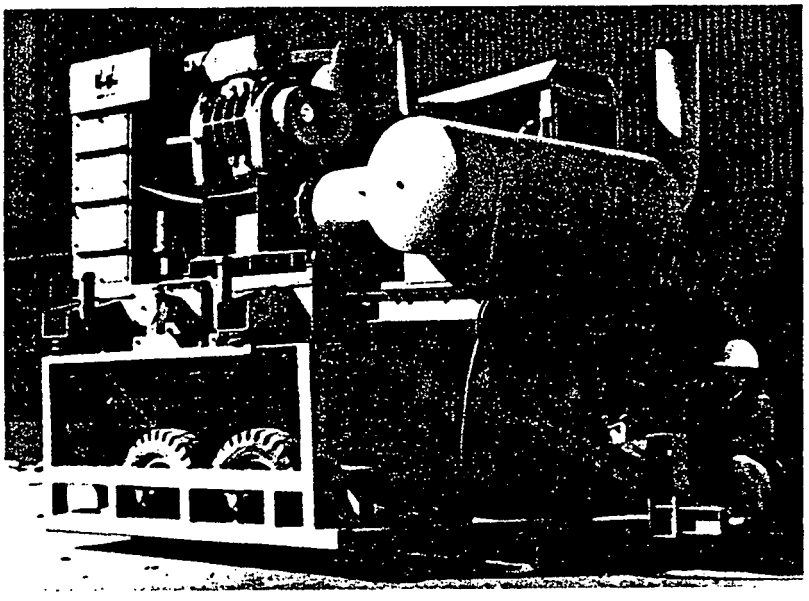
Full Hi-Vac features

All the important Hi-Vac performance and safety features are included in these units: three filtration stages to allow simultaneous wet and dry pickup, a self-diagnostic control panel with several self-protection systems, and a positive displacement vacuum pump for up to 18" (457 mm) of mercury suction.

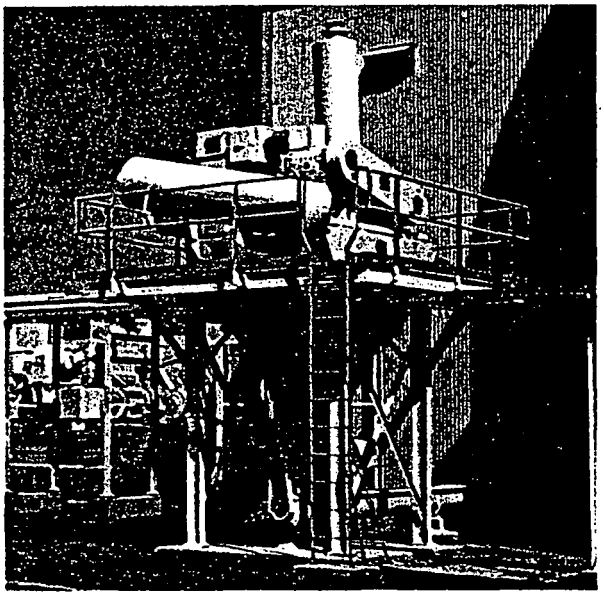
For special or high altitude applications, they can be equipped with a reverse air bag cleaning system or a higher power vacuum pump capable of up to 22" (559 mm) of mercury suction at sea level.

Variety of configurations

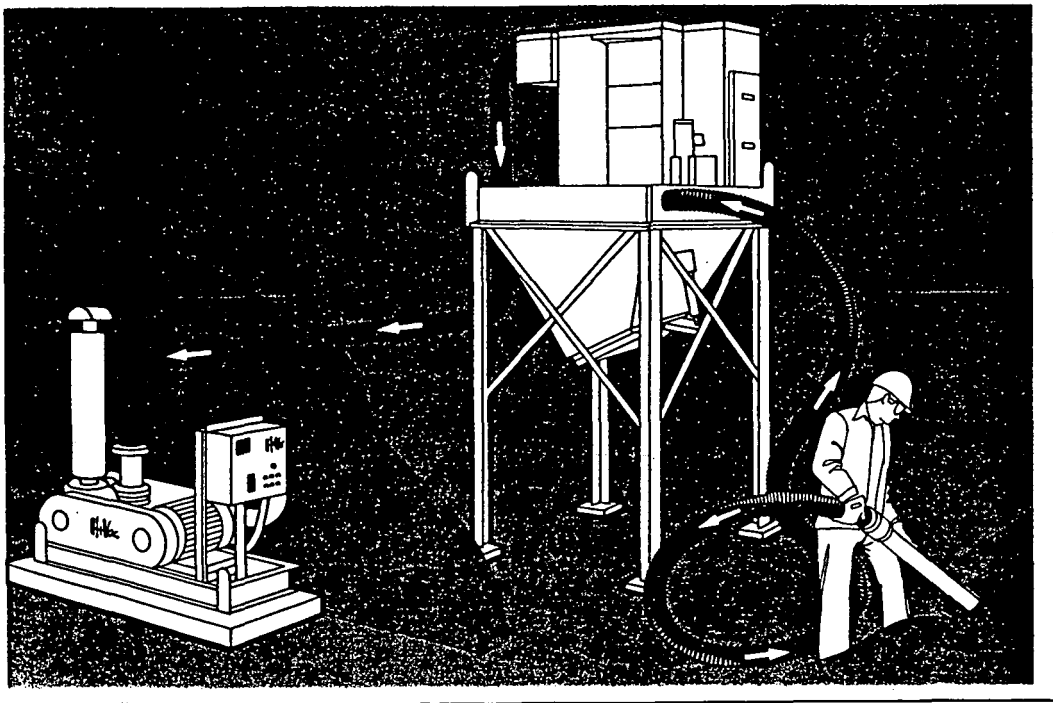
2000 series Hi-Vacs can be used with any of the continous or intermittent discharge arrangements shown on Page 8. NFE engineers will design custom hoppers and mounting arrangements to meet your specific requirements.



This diesel-powered Model 2100 Hi-Vac recovers alumina spilled around reduction pots and paid for itself in less than four months.



Phosphate spilled during rail car unloading is vacuumed by this Model 2100 Hi-Vac.



The powertrain and separation stages of Series 2000 Hi-Vacs can be mounted in separate locations. This arrangement is useful in explosive atmospheres or low-noise areas, and permits ground-level maintenance of all moving parts. An optional sound enclosure/weather shield is available for the powertrain.

case histories

Electric utility operates Hi-Vacs at two of its power plants. Units are used for general cleanup of fly ash, clinker, and spilled coal. When boilers are shut down for periodic maintenance, Hi-Vacs speed removal of fly ash from penthouse compartments, saving approximately 5000 man hours during each cleanout.

Auto foundry's Hi-Vac has paid for itself many times over by preventing costly shutdowns on the block line. Hi-Vac quickly removes large sand spills along conveyors and molding lines to keep production going.

Farm equipment manufacturer uses a Hi-Vac in engine block machining operations. Cast iron chips and dust are sucked up from 20 machining stations through a manifold system whose inlets are automatically controlled by a sequential timer.

Transit authority of a large city uses two Hi-Vacs mounted on a service car to clean subway system. Up to 5 hose lines can be used at once to clean station areas and honey-combed tunnel walls.

Coal **strip mining company** installed Model 220 Hi-Vacs in its drag lines for control center and transformer cleanup.

Farm equipment manufacturer has installed a total of seven Hi-Vacs at three of its foundries. Most are used with manifold systems and at one plant, Hi-Vac is moved between manifolds serving the sand pit and shot reclaim pit.

1000 foot **ore carrier** has two Model 275 Hi-Vacs in its hold to clean up spills around conveyors.

Glass container manufacturer handles spilled cullet and glass batch with a Hi-Vac Model 230. Ability to get production going after big spills soon repaid company's investment.

Alumina processor's Model 250 Hi-Vac "paid for itself" in 90 days by salvaging the valuable material from under aluminum pots.

High temperature **ceramic company** removes and recycles alumina used to back up graphite molds. Material had been scooped out by hand requiring the use of respirators. Hi-Vac 250 connected to a manifold system now serves two molding areas.

Major **jobbing foundry** has purchased Hi-Vacs for each of its six foundries. Units are used for cleanup of shot, sand, sea coal, sludge, etc.

Hi-Vac T-50 truck unit cleans up for a **chemical firm.** In four hours, two men can now clean out an area that had taken four men a week.

Secondary smelter had loaded rail cars with zinc oxide using front end loaders. Dust spilled and blew throughout neighborhood. Now a Hi-Vac manifold system powered by a Model 230 conveys product from storage to rail cars without dust, product loss, or contamination.

Coal company handles troublesome dust from ground and pulverized coal with a Hi-Vac Model 250. Material is too light to sweep and floats when wet. Coal is now vacuumed for use as carbon black.

Quarry uses Hi-Vac Model 230 to vacuum out cloth dust collectors before installing new filter bags.

Aluminum processor cleans between high-amperage buss bars with a Hi-Vac 220. Cleaning around one aluminum reduction "pot" had taken two men a full day. With Hi-Vac, two men can vacuum up around eight pots a day.

Glass manufacturer utilizes a Hi-Vac Model 250 on production line to empty and refill refractory molds.

Railroad has installed 6 Hi-Vacs at various car-cleaning facilities to vacuum out box cars, hoppers, etc. before washing. Most are used with manifold systems to clean out several cars simultaneously. Another Hi-Vac vacuums up sand spill at an engine test terminal.

Giant **cement plant** uses 14 Hi-Vacs to keep cement dust under control. Vacuumed material is easily reclaimed.

Automotive foundry reclaims $800 worth of steel shot spilled from shell molds in just 17 minutes. Hi-Vac Model 250 vacuums material from conveyor pits and at transfer points.

HI-VAC CORPORATION
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Other U.S. and foreign patents issued and pending.

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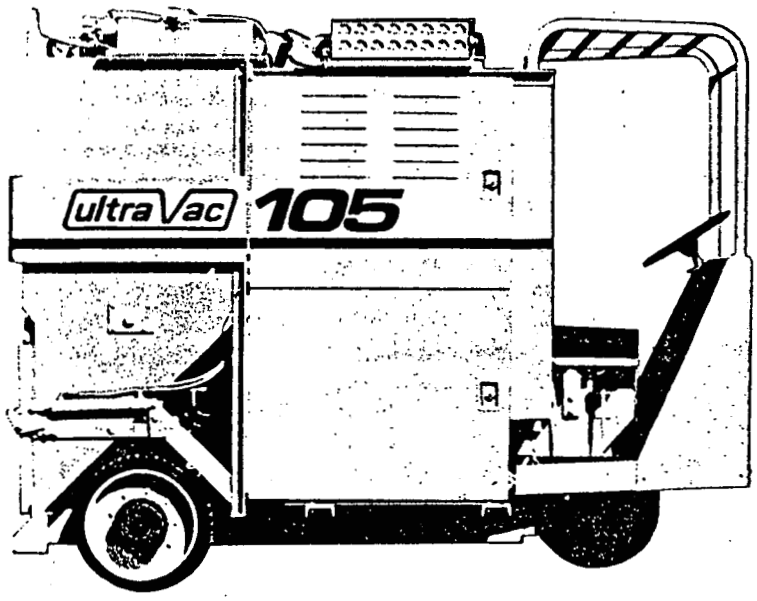
MODELS

105, 115, 125



Efficient mobile industrial vacuum loaders

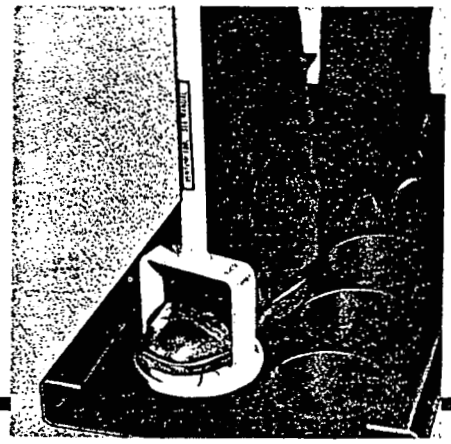
Fewer personnel costs and greater productivity

Ultravac offers you a selection of advanced design mobile industrial vacuum loaders engineered to help you reduce manpower costs and increase productivity. Models 105 and 115 give you a choice of 50 HP diesel, gas or LP engines. The economical Model 125 requires even less maintenance with a virtually trouble-free 50 HP electric motor. All three models load at rates up to 500 lbs./minute at distances up to 300 feet with a large 1 cubic yard capacity. Each features efficient, self-cleaning Ultra-Lok filters which remove 99.9% of all particulate matter 1 micron or larger from the exhaust air.

A choice of units tailored to your needs

To meet your specific requirements you can choose self-propelled or towable models. The versatile Model 105 is self-propelled with a narrow design that goes almost anywhere, turns within a small radius and picks up everything that will pass through its suction hose. If you prefer towable models, choose Models 115 or 125. All models feature a stable three-wheel carrier, hard rubber tires, silenced blower, pulse jet filter cleaning, sturdy steel construction and are finished with super-durable acrylic enamel. All Ultravac loaders come with free start-up by factory representatives.

Ultravac. Vacuum loaders you can rely on... from the company that originated industrial vacuum loader technology. The full-line manufacturer of self-propelled, towable, truck mounted and stationary vacuum loaders.



Exclusive Ultra-Lok system saves you time with fast, easy filter removal and assembly.

MODELS

105, 115, 125

Mobile industrial vacuum loaders

Applications

Ultravac vacuum loaders can be used for efficiently vacuuming powder, sludge, slurries or any materials which will pass through the suction lines from remote and inaccessible locations.

Overall dimensions and weight

Model	Length	Width	Height	Weight
105	107" (271.8 cm)	58" (147.3 cm)	82" (208.3 cm)	7300 lbs. (3311 kg)
115	106" (269.2 cm)	58" (147.3 cm)	82" (208.3 cm)	6600 lbs (2994 kg)
125	106" (269.2 cm)	58" (147.3 cm)	82" (208.3 cm)	6600 lbs (2994 kg)

Power units

Models 105 and 115 come with a standard 50 HP diesel or an optional gas or LP engine. Model 125 comes with a 50 HP electric motor. All models feature conveniently located control cabinets containing all necessary instrumentation for ease of operation.

Performance specifications

Same for Models 105, 115 and 125:

Airflow ..... 1100 CFM (31 m^3/min.)
Loading rate ..... 300-500 lb./minute (113-227 kg/min.)
Conveying distance ..... 300 ft (max.) (92m)
Vacuum rating ..... 15 in. Hg (381 mm Hg)
Capacity ..... 1 cubic yard (.9m^3)
Vacuum intake ..... up to 6" hose (150mm)
Blower type ..... positive displacement rotary lobe

Filtration system

Same for Models 105, 115 and 125:

Number of bags 27
Bag length ..... 30 in. (7.62 cm)
Bag retaining method ..... dry—21 oz. Dacron (595 g)
wet—9 oz. Monofiliment Polypropylene (255 g)
hot—high temperature Nomex

Unloading technique

Hydraulic tailgate with a 45 degree hopper floor dump angle.

Parts and service

Ultravac maintains the largest parts inventory in the vacuum loading industry and complete in-house and field service programs. As a regular part of our sales/service policy, Ultravac will come to the operational site and "start up" all newly purchased units upon delivery.

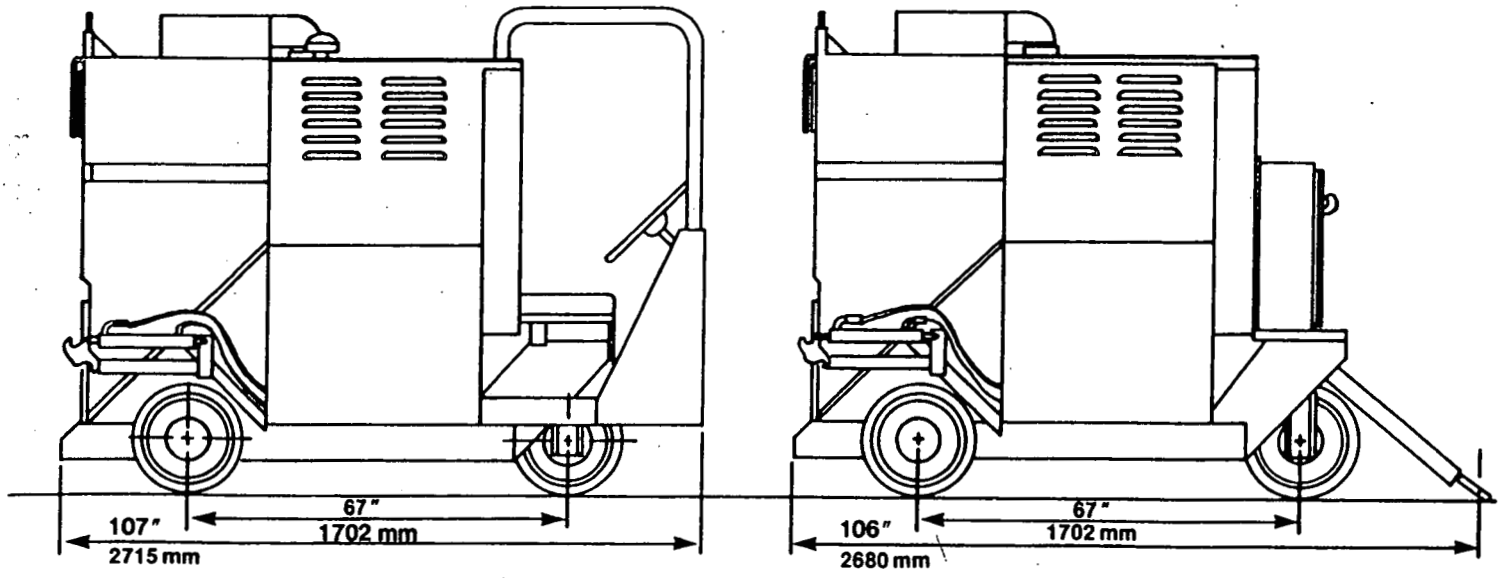
Warranty

Ultravac warrants its vacuum loading equipment to be free of defects in workmanship and material for one year, in accordance with its general Warranty Policy.

All specifications subject to change without notice.

Optional accessories

	105	115	125
Gas or LP engine	X	X	
2 yd^3 hopper	X	X	X
Bin vibrator	X	X	X
Air line de-icer	X	X	X
Air line dryer	X	X	X
Automatic air tank drain valve	X	X	X
Magnehelic gauge for reading Baghouse pressure	X	X	X
Rotating beacon light	X	X	X
Back-up alarm	X	X	X
Dual rear view mirrors	X	X	X
Fire extinguisher	X	X	X
Blower protection system	X	X	X
Farr "Roto-Pamic" air cleaner	X	X	
Catalytic exhaust purifier	X	X	
Sound attenuation package	X	X	X
High temperature filter bags	X	X	X



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VACUUM LOADING SYSTEMS

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